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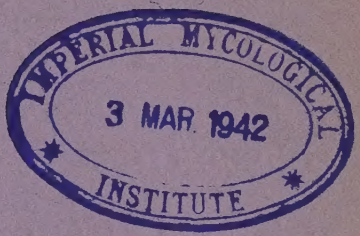

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1942

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Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

A list of annotations and reviews, classified according to subject, is now given in *Index Veterinarius*, being inserted at the end of each number. Such papers will not necessarily be dealt with in the *Veterinary Bulletin*.

Review on "Antibacterial Agents derived from Micro-Organisms"

Reprints of this review may be obtained from: Central Sales Branch (Imperial Agricultural Bureaux), Agricultural Research Building, Penglais, Aberystwyth. Price 1/- each.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

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DISEASES CAUSED BY BACTERIA AND FUNGI

FRANCIS, J. (1941). **Chronic Bovine Mastitis : Factors Possibly Related to its Pathogenesis.**—*Vet. Rec.* **53.** 395–399.

A well annotated review written to summarize the position of *Streptococcus agalactiae* in relation to chronic bovine mastitis and to suggest that invasion of the udder by this organism is dependent upon the condition of the teat sphincter and the development of a pre-existing nonspecific mastitis. It is pointed out that evolutionary and involutionary changes in the udder tissue dependent upon the action of hormones, particularly the oestrogens, cause a chronic mastitis in women and it is suggested that such factors may operate in the chronic form of mastitis in cattle.

OCHI, Y., & HIRAO, R. (1941). **Studies on Equine Hemolytic Streptococci, Especially on their Variability.**—*Jap. J. vet. Sci.* **3.** 49–70. [In Japanese: abst. from English summary].

Cultural studies of equine haemolytic streptococci have differentiated three types and several variants.

Type I is associated with strangles. It grows with large slimy colonies on blood agar, and does not ferment lactose, sorbitol, or trehalose. Three variants appear after subculture.

Type II has been isolated from various purulent lesions and from the uninjured mucous membrane of horses. It appears in transparent non-mucoid colonies, and ferments lactose and sorbitol, but not trehalose. Subculture produces two variants.

Type III has been found on the intact mucous membrane of many animals and man. The colonies are dry and opaque. Lactose and trehalose are fermented, but not sorbitol. No variants appear on subculture.—D. D. OGILVIE.

CHRISTIE, R., & GRAYDON, J. J. (1941). **Observations on Staphylococcal Haemolysins and Staphylococcal Lipase.**—*Aust. J. exp. Biol. med. Sci.* **19.** 9–16.

Twenty-four pathogenic and 24 non-pathogenic strains of staphylococci were examined for type of haemolysis and for lipase production. The latter property was tested on nutrient agar containing 0·1% washed butterfat and 0·005% neutral red, this medium giving clear-cut results. Lipase production was found to be independent of haemolysin production and of pathogenicity as judged by the coagulase test. Staphylococcal lipase does not lyse normal sheep red cells, but it does after they have been treated with staphylococcal β toxin; it does not augment the lytic action of staphylococcal α toxin. Further, it was found that sheep red cells are rendered resistant to the lytic action of staphylococcal α toxin by previous treatment with staphylococcal β toxin. On the other hand, under suitable conditions staphylococcal β toxin, which does not lyse normal sheep cells, will render more complete the lysis of cells treated with α toxin. Most of these reactions were carried out both on plates and in the test tube. The mode of action of staphylococcal toxins on sheep cells is discussed in the light of these findings.—W. I. B. BEVERIDGE.

STAMATIN, N. (1939). Desfacerea funcţiunei imunisante de funcţiunei patogene la bacteridia carbunoasă. **[Separation of Immunizing Power from Pathogenic Effect in Anthrax Cultures].**—*Arhiva vet.* **31.** No. 4–5. 47–65.

S. discusses the antigenic and pathogenic qualities of encapsulated and non-encapsulated strains of *Bacillus anthracis*, with special reference to the reduction or absence of patho-

genicity in non-encapsulated strains which retain their immunizing value.

He reviews work which tends to show that septicaemic anthrax can only be caused by encapsulated strains, non-encapsulated strains producing only oedema at the site of inoculation. He also reviews work which demonstrates the capacity of non-encapsulated strains to produce immunity to capsulated ones.—M. W.

VIERA, O. (1941). Experimentación con Bacillus anthracis. [**Research on** *B. anthracis*].—*An. Fac. Vet., Montevideo.* **3.** 615–625.

A review of present knowledge with no new material.—MILLER WATSON.

BULL, L. B. (1941). **A Note on the Complement Fixation Test as an Aid to Diagnosis in the Eradication of Tuberculosis in Cattle.**—*Aust. vet. J.* **17.** 48–52.

B. discusses the recently published results of Australian investigations on the reliability of tuberculin tests [*V. B.* **11.** 699]. Slaughter of 780 non-reactors had revealed 1·8% with advanced lesions and 1·5% with small lesions. Only about half of the advanced, generalized cases had given a positive reaction.

Sera from 13 non-reacting cows with advanced lesions all gave a positive complement-fixation reaction. Sera from five cows, which had early lesions but failed to react, were also tested by complement fixation; three gave positive reactions, one was doubtful, and one negative. Assuming that a completely satisfactory c.-f. test can be evolved, it is suggested that it may be used with advantage in eradication work in conjunction with the tuberculin test, particularly for the detection of the dangerous advanced cases.—W. I. B. B.

VAN DER PLANK, G. M. (1939). Erbliche Veranlagung fuer Tuberkulose bei Rindern. [**Hereditary Disposition to TB. in Cattle**].—*IV Congr. int. Pat. comp., 1939.* **2.** 315–319. [In German].

P. attempted from a study of herd-book records of cattle, which were under control for TB. eradication, to collect evidence for or against the theory that cattle have a hereditary disposition to TB., but he was unable to obtain any significant statistical data. It appeared that no particular bovine family or line was particularly prone to contract TB. when exposed to infection.—J. E.

WELLS, W. F., & LURIE, M. B. (1941). **Experimental Air-Borne Disease. Quantitative Natural Respiratory Contagion of Tuberculosis.**—*Amer. J. Hyg.* Sect. B. **34.** 21–40. [Authors' conclusions copied *verbatim*].

1. Apparatus and methods for the study of quantitative, natural, air-borne contagion which have the following characteristics as applied particularly to respiratory infection in tuberculosis are presented: (a) They estimate with constancy and considerable accuracy the "dose" of naturally inhaled infection units. (b) The survival period, the preallergic interval, and the type and progress of the ensuing disease are functions of the dose of naturally inhaled microorganisms. (c) With exposure to small, known doses, the disease reproduces that occurring in rabbits of different inherited natural resistance when exposed to infected cage-mates. This disease in the susceptible rabbits has the characteristics of a first infection, and resembles progressive primary tuberculosis in man. In the resistant rabbits, it pursues a more chronic course, resembling re-infection tuberculosis, or adult pulmonary phthisis in man.

2. When pure cultures of tubercle bacilli suspended in the air are exposed at an average distance of 5 centimeters (120 $m\mu/cm^2$) for 3 seconds, to ultraviolet light of 2537–Å wave-band, 94 per cent are killed.

LONG, E. R., & VOGT, A. B. (1941). **Relation of Sex to the Course of Experimental Tuberculosis in Mice.**—*Amer. Rev. Tuberc.* **44.** 196–222.

While the results of experiments on the course of experimental TB. in adolescent mice, which were normal, castrated, or treated with sex hormones, were not conclusive, it was noted that ovariectomized mice outlived the normal females, and the average intensity of the induced TB., especially of the lungs, was somewhat less.—E. COTCHIN.

BENDA, R., & URQUIA, D. A. (1940). Caractères particuliers des granulations des polynucléaires neutrophiles chez les tuberculeux et au cours de la tuberculose expérimentale du cobaye. [**Nature of Granules in Neutrophile Polymorphonuclear Leucocytes in TB. in Man and in the G. Pig.**]—*Sang.* **14.** 65–76.

The authors describe the appearance of a

special type of polynuclear leucocyte in the blood of human beings and g. pigs with TB. These cells have a diameter of 9–12μ and are packed with large granules of irregular size arranged round the periphery. In extreme cases 98–100% of the polynuclears assume this form, while in other instances the proportion varies from 30–50%. Tables are given showing the numbers of abnormal cells produced during the course of experimental TB. in the g. pig. According to the authors an examination of a blood smear is a useful adjunct to the more usual methods of diagnosing the disease.

—R. E. GLOVER.

NEDELKOVITCH, J. (1939–40). Le problème de la virulence du bacille de Koch. **[The Problem of the Virulence of Tubercle Bacilli]**.—*Rev. Tuberc., Paris.* **5.** 1170–1174.

Reviewing his many years' research on TB. in man, N. reports that he has found no parallel between the virulence of the organism as isolated and tested on experimental animals and the severity of the tuberculous lesions in the host.

He found that tubercle bacilli retain their original virulence in healed tuberculous lesions; in other words the body carries out its healing process in spite of the presence of virulent tubercle bacilli.—J. E.

—. (1939–40). Discussion des rapports de MM. Boquet et Saenz. **[Discussion of the Papers by Boquet and Saenz on the Virulence of Tubercle Bacilli]**. [Speakers: BERGERON, A., COULAUD, E., SERGENT, Em., MAIGNON, JULLIEN, L., RIST, BOQUET, & BEZANÇON, F.]—*Rev. Tuberc., Paris.* **5.** 1175–1190. [For abstracts of the papers referred to, see *V. B.* **10.** 737, and **11.** 664].

BERGERON reported the intratesticular inoculation of a rabbit with dead bovine type tubercle bacilli suspended in liquid paraffin alone. Instead of obtaining severe pulmonary caseation as SAENZ did, he stated that the lungs of his first rabbit appeared normal on naked-eye inspection, but histological sections showed the presence of a heavy infiltration of oil drops. The second rabbit showed oil-drop infiltration of the testicle only. B. also described research which tended to show that human type bacilli isolated from cases of acute progressive TB. in man cause a more rapid and intense TB. in g. pigs than bacilli from cases of chronic TB. COULAUD claimed credit for the idea of using liquid paraffin in TB. research. SERGENT emphasized the importance of terrain (the body of the host) in the problem and JULLIEN spoke in support of this. MAIGNON discussed the theory of bacterial autolysis as a source of noxious substance, which may be responsible for the lung lesions described by SAENZ. BEZANÇON, concluding the discussion, considered that the virulence of the tubercle bacillus is secondary to the terrain in determining the development of tuberculous infection.

—J. E.

CARPANO, M. (1939). Su di un particolare aggruppamento del bacillo tubercolare in corpi sferoidali (globi tubercolari). **[Grouping of Tubercle Bacilli in Spheroids]**.—*Riv. milit. Med. vet., Roma.* **2.** 107–113.

C. studied tuberculous material and found that the tubercle bacillus formed spheroidal bodies similar to those formed by *Mycobacterium leprae*. He states that these spheroids are not found more often because of inadequate staining methods and also because they are only found in old lesions. They are not found in bovine tuberculous lesions, but are seen in infections in human beings and buffaloes and also in avian infection.

The spheroids are composed of agglutinated bacilli which may be so closely packed as to present an almost homogeneous appearance. Sometimes they are surrounded by a clear zone which gives them the appearance of being encysted. The spheroids appear to be formed, in part, by tissue reaction, but C. considers that they constitute a resistant form of the organism.—MILLER WATSON.

BENZONI, G. (1939). Ricerche comparative di vaccinazione antitubercolare con B.C.G. ed Anatubercolina integrale nel topolino bianco. **[Comparative Researches with Antituberculous BCG Inoculation and Whole Anatuberculin in the White Mouse]**.—*Riv. Pat. Clin. Tuberc.* **13.** 415–420. [Abst. in *Tubercle, Lond.* **20.** 569, copied *verbatim*].

Benzoni inoculated a hundred white mice with B. C. G. and whole anatuberculin, and found that while both the vaccines conferred a certain amount of resistance to tuberculous infection, the immunity produced by B.C.G.

seemed to be more pronounced, more rapid in its production and more permanent than that produced by whole anatuberculin.

HÜLPHERS, G. (1938). Några disinfektionsförsök med natriumortofenylfenolat på tuberkelbaciller. [**Disinfection Trials on Tubercle Bacilli with Sodium Orthophenylphenolate**].—*Skand. VetTidskr.* **28.** 597–605. [Abst. from English summary]. [See also *V. B.* **10.** 821, and **11.** 212].

It was found that sodium *o*-phenyl-phenolate, in a 1% solution was unable to kill tubercle bacilli in an emulsion of g. pig spleen within 20 min., but that, on the other hand, a 5% solution of chloramine killed such bacilli within 15 min. A 2% solution of sodium *o*-phenyl-phenolate did not kill tubercle bacilli in uterine secretions and in milk sediment within one hour.

HENLEY, R. R. (1940). **A Note Concerning the Influence of Zinc on the Growth of Tubercle Bacilli on Malate Media.**—*Amer. J. vet. Res.* **1.** 25–26.

It was demonstrated that the addition of zinc as $ZnSO_4$ to malate media caused an increase in the rate and amount of growth of *Mycobacterium tuberculosis*. As sulphur is a regular constituent of the medium, being present in the form of $MgSO_4$, the growth-promoting element appears to be Zn. Incidentally it was found that the asparagine medium which was used to produce tuberculin also contained 24 mg. Zn per 100 g. of asparagine. Whether Zn is an essential metabolite for the growth of *M. tuberculosis* is not yet determined—R. ALLCROFT.

ATKINSON, N. (1941). **A Study of Some Australian Strains of *Erysipelothrix*.**—*Aust. J. exp. Biol. med. Sci.* **19.** 45–50.

A. investigated 33 Australian strains of *Erysipelothrix* from ovine arthritis and porcine arthritis and erysipelas. The morphological and cultural characteristics agreed well with those described elsewhere. Serological tests showed two distinct antigenic types and a third intermediate type. Strains were divided into these types by means of agglutination with specific, absorbed sera. A specific substance, probably a carbohydrate, was extracted from *Erysipelothrix* of each type and this could be utilized in ring precipitation tests. There was no particular relationship between antigenic type and source of culture or virulence as shown by pathogenicity tests in pigs and mice.

—W. I. B. BEVERIDGE.

VAN ES, L., OLNEY, J. F., & BLORE, I. C. (1941). **Some Factors Influencing Swine Erysipelas Prophylaxis.**—*Proc. 44th ann. Meet. U.S. Live Stk sanit. Ass., 1940.* 34–42.

The results of potency tests on pigeons of commercial samples of *Erysipelothrix rhusiopathiae* serum are recorded. Leclainche's method was used. In order to avoid difficulties of interpretation due to varying susceptibilities of individual birds, each of the surviving pigeons in a test was accredited with a number of points, *viz*, birds receiving 0·5 c.c. serum +0·5 c.c. culture, 10 points; 0·25 c.c. serum + 0·5 c.c. culture, 5 points; 0·1 c.c. serum +0·5 c.c. culture, 2 points; 0·05 c.c. serum + 0·5 c.c. culture, 1 point. The tests showed that during the first half of 1939, 69·5% of the samples had a potency varying from nil to 39 and 30·5% of 40–59. During the second half of 1939 and part of 1940, 20% had a potency of 25–39 and 80% of 40–67. There was therefore a great improvement in the general quality of the serum, but there were still wide fluctuations of potency. Since excessive doses of potent serum may reduce the chances of adequate protection following immunization of pigs by the Lorenz method, it is important that a uniform level of serum potency should be demanded. Until this demand is satisfied, occasional disappointing results following vaccination of swine must be expected.—D. D. OGILVIE.

TOMAŠEC, I. (1939). Prilog diagnostici B. gallinarum i B. pseudotuberculosis rodentium. [**Comparative diagnosis of *Salmonella gallinarum* and *Pasteurella pseudotuberculosis rodentium* Infections**]. —*Vet. Arhiv.* **9.** 353–358. [German summary].

The structure of colonies of *S. gallinarum* is constant. *Pasteurella pseudotuberculosis rodentium* undergoes considerable changes when cultivated for long periods and its characters then resemble those of *S. gallinarum*.—B. O.

WAGENER, K., & MATZKE, M. (1940). Geflügelcholera, Jahreszeit und Vitamin A. [**Fowl Cholera, Time of Year, and Vitamin A**].—*Berl. Münch. tierärztl. Wschr.* July 26th. 357–361.

There are three possibilities in the infection of fowls by fowl cholera [F.C.] bacilli:—(1) there may be acute septicaemia and early death from F.C.; (2) there may be a chronic (usually

localized) non-lethal infection, and (3) fowls may become healthy carriers of the organism. The commonest clinical form of (2) is " wattle disease ", in which cold and trauma are usually considered to play a part.

Four experiments were carried out. In the first, three cocks with " wattle disease " were placed in a pen containing 72 hens. During a six-months period two of the cocks and 13 hens died, seven hens from acute F.C. and six from local infection with the organism followed by death. Frosty weather (up to −16°C.) occurred during this and the following experiments.

During the same period another group of fowls was kept in a pen 5 metres away from the above group ; no case of F.C. occurred among them, so the surviving cock was placed with them. As, however, this cock immediately began to fight with the one already present, it was removed after 10 min., but not before it had wounded the other one about the head. The wounded cock developed " wattle disease " in three days and died after 15 days and a hen developed " wattle disease " on the 43rd day but recovered.

The survivors from the first experiment were removed and replaced the next day by a fresh lot of 13 hens, which had been found free from F.C. infection. Three hens died, one after developing oedema of the wattles similar in appearance to chronic F.C., but from none was the F.C. bacillus recovered. This result indicates that the ground does not harbour virulent F.C. bacilli.

In the final experiment four hens and two cocks, the last two with healed " wattle disease " lesions, were placed with 13 healthy fowls. Of these only one bird, a cock, developed " wattle disease " and died. It was assumed that the infection came from the carrier cocks.

In all these experiments detailed P.M. examinations were carried out on all birds which died and the F.C. bacillus was isolated whenever possible and tested for virulence on mice, rabbits, g. pigs, and fowls. It was thus shown that the strains were of low virulence as compared with strains from outbreaks of acute F.C. It was also determined that many of the birds were affected with avitaminosis A [see also SEIFRIED—*V. B.* **8.** 304, and **10.** 49.]—and this, as well as the cold weather, is considered to have predisposed to infection. Prussian statistics of F.C. outbreaks clearly show the connexion between the cold period of the year and incidence of F.C.—J. E.

MORSELLI, G. (1939). Tentativi di vaccinazione dei conigli contro la setticemia emorragica con vaccino glucosidato. [**Vaccination Trials against Haemorrhagic Septicaemia of Rabbits with a Glucoside Vaccine**].—*Riv. milit. Med. vet., Roma.* **2.** 356–365.

M. prepared a vaccine, from broth culture of pasteurella of rabbit origin, containing 1% saponin. He found that it gave best results when kept at room temperature for 12 days. Rabbits developed a solid immunity 15 days after receiving one dose. The immunity was not lasting, however, some animals proving susceptible after 60 days.—MILLER WATSON.

THJØTTA, T. (1941). Et tilfelle av tularemi ervervet gjennom insektstikk. [**Tularaemia Following Insect Bites**].—*Nord. Med.* **9.** 285–286. [English summary copied *verbatim*].

The author describes a case of tularaemia probably caused by the bite of mosquitoes. The primary lesion occurred in the very spots where the patient was intensely bitten by the insects. He had had no dealings with any kind of rodents.

COLE, R. K. (1941). **Listeria (Listerella) Infection in the Fowl.**—*Poult. Sci.* **20.** 28–32.

Listeria infection of poultry has been reported previously in the U.S.A. and in England. During the autumn of 1939, C. observed massive focal necrosis of the myocardium in several birds from the same flock. The pullets were in poor condition and apart from the heart lesions, two birds showed small ulcers in the ileum and caeca. Primary cultures of the necrotic foci yielded pure cultures of *Listeria* in eight cases. During the period July 1st to August 20th, 1940, a further 18 cases were observed amongst young stock using the same range. There was, however, a marked difference in the site of the lesions since focal necrosis of the liver was present in many cases in addition to the heart lesions. The total number of poultry in the flock concerned was 2,500. It is suggested the economic importance of the disease may not be inconsiderable.

—J. S. PATERSON.

MATZKE, M. (1940). Enteritis-(Breslau) Infektion bei Elefanten. [*Salmonella typhi-murium* **Infection in Elephants**].—*Tierärztl. Rdsch.* **46.** 521–522.

All 13 elephants belonging to a travelling

circus became ill. Four of them were seriously affected with symptoms of diarrhoea, *viz*, straining and loss of condition. Three of the elephants died and a P.M. examination was carried out on one of them. A salmonella organism, which was later identified as *S. typhi-murium*, was isolated from the liver and intestine of this elephant.

It is assumed that all 13 elephants became infected through eating contaminated food.

—J. Francis.

Jansen, J. (1940). Die epidemiologische und epizootische Bedeutung der Typen des Breslau-Bacteriums. **[The Epidemiological Importance of *Salmonella typhi-murium*].**—*Z. Hyg. Infektkr.* **122.** 412–419.

J. maintains, as a result of seven years' experience of paratyphoid in ducks and other species that there are distinct types of *S. typhi-murium* which can be differentiated by their biochemical activities and on epidemiological grounds. He describes a number of outbreaks in support of his contention. The type strain was isolated from an outbreak in Bohemian silk-tails (*Ampelis* sp.) at a bird fancier's premises, and after slaughter of all surviving birds the premises were very thoroughly disinfected. After restocking, another outbreak occurred and from various wild birds which died the duck type was isolated. The fact that a different type caused the second outbreak is given as proof that the disinfection was effective.

This article is mainly a criticism of Lerche's statement [*V. B.* **10.** 10.] that biochemical types do not represent distinct types. Edwards & Bruner [*V. B.* **9.** 827.] and Hohn & Hermann [(1939). *Z. Hyg. InfektKr.* **122.** 227.] are quoted in support.—G. Slavin.

Bornstein, S., Saphra, I., & Strauss, L. (1941). **Frequency of Occurrence of Salmonella Species.**—*J. infect. Dis.* **69.** 59–64.

A report on 280 salmonella strains observed at the New York Salmonella Centre during 20 months. The most frequent type was *S. typhi-murium*. A culture of *S. abortus-equi* is recorded as having been recovered from a case of human infection in Havana, probably contracted in a laboratory. *S. cholerae-suis* was found in human cases of pleurisy, bronchopneumonia, peritonitis, psoas abscess, and periproctal abscess.—E. Cotchin.

Bruner, D. W., & Edwards, P. R. (1941). **Microörganisms of Group E of the Genus *Salmonella* with Special Reference to a New *Salmonella* Type.**—*Amer. J. Hyg.* Sect. B. **34.** 82–86. [Authors' conclusions copied *verbatim*].

The results of a study of 64 cultures of group E of the genus *Salmonella* are described. The types recognized included *S. senftenberg*, *S. london*, *S. give*, *S. anatum*, *S. lexington*, *S. newington* and *S. new brunswick*. The organisms were isolated from turkeys, chickens, ducks, hogs, man and water. A new *Salmonella* type *S. meleagridis* [from turkeys], the antigenic formula of which is III X XXVI : eh : lw, is described.

Ogonuki, H. (1940). **Acid Agglutination in Salmonella Group.**—*Kitasato Arch. exp. Med.* **17.** 80–87. [In English].

A study of the acid agglutination of the salmonella group on the basis of the newer knowledge of their antigenic structures showed that the flagellar antigens produced the loose flocculent type of acid agglutination, since strains of similar flagellar antigenic structure had the same optimal pH zone and strains poor in H antigen exhibited no acid agglutination. O. considered that, although acid agglutination had little diagnostic value in the differentiation of salmonella types, it afforded a good supplementary method for type differentiation in the *S. enteritidis* and allied groups.—R. O. Muir.

I. DeVolt, H. M., Quigley, G. D., & Byerly, T. C. (1941). **Studies of Resistance to Pullorum Disease in Chickens.**—*Poult. Sci.* **20.** 339–341.

II. Hutt, F. B., & Scholes, J. C. (1941). **Genetics of the Fowl. XIII. Breed Differences in Susceptibility to *Salmonella pullorum*.**—*Ibid.* 342–352. [See also *V. B.* **9.** 798].

I. Chicks which were progeny selected for survival in the presence of natural pullorum infection, showed an average resistance 2–3 times as great as that shown by chicks from pullorum-clean flocks, when inoculated with *Salmonella pullorum*. Chicks from blood-tested flocks which contained some reactors, and in which natural selection had doubtless operated in the presence of pullorum infection for some time, showed the same average resistance as the progeny-selected group. While chicks from pullorum-clean flocks were relatively suscept-

ible to artificial pullorum infection, the resistance throughout the whole experiment was relatively low, and the data indicate that the development of pullorum-resistant strains is not a satisfactory substitute for agglutination testing.

II. Extensive field experience in certain states of the U.S.A. has shown that the proportion of White Leghorns which gave a positive reaction to the aggln. test for pullorum disease was one-ninth to one-third the proportion of positive reactors among heavy breeds. This difference is attributed to a greater genetical resistance to the disease on the part of the Leghorns.

In controlled experiments, chicks from several strains of Leghorns were always more resistant, both to artificial inoculation with pullorum organisms, and to contact infection, than were the heavy breeds. This resistance is associated with the Leghorn breed generally, and not only with the White variety. The possibility of utilizing this characteristic as a means of building up a pullorum-resistant flock is discussed, the authors considering that, as far as White Leghorns are concerned, the value of constant blood testing is open to question. —R. F. Gordon.

Castagnoli, B. (1938). L'infuso di patate per la differenzazione delle brucelle. **[Differentiation of Brucella by Potato Infusion Medium].**—*R. C. Ist. Sanit. pubbl., Roma.* **1.** 565–579.

C. found potato infusion adjusted to pH 6 a useful differential medium for the culture of brucella, the pH being important. *Br. melitensis* and *Br. suis* grew very rapidly in the medium, turning the fluid turbid and forming a distinct superficial ring in 48 hours. *Br. abortus* did not produce turbidity and any growth that occurred, was slow. No R variants developed. The 48th hour, at 38°C., is the best time for comparison.—M. Watson.

Eldering, G. (1941). **A Study of the Antigenic Properties of *Hemophilus pertussis* and Related Organisms. I. An Antigenic Fraction Obtained from *Brucella bronchiseptica*.**—*Amer. J. Hyg.* Sect. B. **34.** 1–7. [Author's summary copied *verbatim*].

An antigenic fraction isolated from *Br. bronchiseptica* has been described. This fraction gives a positive Molisch reaction and is free from intact protein. It protects mice against *Br. bronchiseptica* infection and to a lesser degree against infection with *H. pertussis* and the para-pertussis bacillus.

Francesco, M. (1939). Contributo alla vaccinazione antitetanica negli equini. **[Anti-Tetanic Vaccination of Horses].**—*Riv. milit. Med. vet., Roma.* **2.** 340–355.

F. reviews the methods of anti-tetanic immunization and describes his experiments with potassium alum and calcium chloride toxoids. Before inoculating horses, he tested their blood for tetanus antitoxin and only inoculated those with negligible titres. Details of the preparation of the toxoids are not given.

Of the horses treated with calcium chloride toxoid, 80% developed 1/100 I.U. per ml. of antitoxin in the blood and 40% 1/50 I.U. per ml. Those treated with potassium alum toxoid developed a higher antitoxin titre, 100% having at least 1/100 I.U. per ml. and 50% having up to 1/50 I.U. per ml. These estimations were carried out 30 days after the second inoculation and 60 days after the first. The dose of toxoid was 10 ml. in each case.—M. W.

Schiff, F. (1939). **An Ecto-Enzyme of Clostridium welchii which Decomposes Blood Group Specific Substance A.**—*J. infect. Dis.* **65.** 127–133. [Author's summary copied *verbatim*].

From cultures of Cl. welchii, a germ-free, group-specific, enzyme was prepared by filtration. The production of the enzyme in cultures is suppressed in the presence of such carbohydrates which are fermented by Cl. welchii.

The enzyme is almost strictly specific for blood group A.

The group specific enzyme is destroyed by pH 6 and at values below this. It is inactivated by oxidation and may be reactivated by reduction. The enzyme is not connected with any hemotoxin.

Kellaway, C. H., & Trethewie, E. R. (1941). **Tissue Injury by the Toxin of *Cl. welchii*, Type A.**—*Aust. J. exp. Biol. med. Sci.* **19.** 17–27.

The action of toxin of *Clostridium welchii* Type A was studied on perfused organs of g. pigs, rabbits, or cats. Unlike toxin from Type D, it fails to cause liberation of histamine or " S.R.S." (a slow-reacting muscle stimulant

substance) from perfused organs, but it sets free pigment and coagulable proteins from the perfused liver, and adenyl compounds and an inactivating enzyme from the perfused liver and hind limbs of the rabbit. The toxin causes no immediate, direct liberation of adrenalin from the adrenals but the residual adrenalin in the glands in g. pigs dying from toxaemia is greatly diminished. As has been shown by previous workers, the toxin causes contraction of smooth muscle. This is a general effect on many kinds of smooth muscle, including the bronchial musculature of the g. pig, the pulmonary and coronary vessels of the rabbit, and the gut and the uterus of the g. pig. This is regarded as a direct effect of the toxin since there is no histamine or S.R.S. liberated.—W. I. B. Beveridge.

Rodwell, A. W. (1941). **Serological Subtypes in *Cl. welchii* Types A, B, C and D.**—*Aust. vet. J.* **17.** 58–68.

A large number of strains of *Clostridium welchii*, representative of all four toxigenic types of Wilsdon, were examined serologically by agglutination, agglutinin absorption, and precipitin tests in an endeavour to find serological groups which might be useful for identification in place of the relatively laborious typing by toxin neutralization tests. It was found that several serological subtypes exist within the toxigenic types. Subtypes distinguished by precipitin tests with 1% sodium carbonate extracts agree with those distinguished by agglutination, but the antisera against some strains failed to precipitate with the extracts.

Strains belonging to the same serological subtype always belonged to the same Wilsdon type. The large and still undetermined number of subtypes makes it impossible at present to attempt to utilize agglutination to identify strains according to their toxigenic type; if all the subtypes were known, their excessive number might make such an attempt impracticable, at least with Type A and probably with Type D. Four out of five Type C strains belonged to the same subtype, so that identification by agglutination may be feasible with this type. Only three strains of Type B were examined, and a generalization regarding the possibilities with this Type cannot therefore be made.—W. I. B. Beveridge.

Taylor, A. W., & Stewart, J. (1941). **The Toxins Produced by *Clostridium welchii* in a Simple Medium.**—*J. Path. Bact.* **53.** 87–94.

Several interesting findings were obtained by growing the four types of *Cl. welchii* in a simple medium, containing no animal tissue. The essential ingredients were "bacto" peptone, casein, glucose, and salts. The action of trypsin on toxin production, and also the effect of maintaining a constant pH in the medium was studied.

The strains examined all grew readily in this medium, but toxin yield varied among the types. Type B strains produced a potent toxin apparently with the action of Type C, but antigenic properties of Type B. Production of Type C toxin was favourably affected by the maintenance of pH 7·6–7·8. Cultures of Type D produced lethal toxin only when constant pH was maintained, but the dried material could stimulate antitoxin production. No appreciable amount of Type A toxin was produced in the simple medium, in contrast to the toxic growth obtained in meat broth.

The action of trypsin on toxins of Types B and D was confirmed [see also Dalling & Ross—*V. B.* **9.** 688]. The presence of this enzyme caused enhanced toxicity in both Types B and D cultures and in solutions of dried toxin. It also caused the production of Type D toxin when added to young cultures of Type B or to solutions of dried Type B toxin.

It is noted that in its toxigenic requirements *Cl. welchii* Type A differs appreciably from the other members of the group in requiring some factor present in meat broth but not in the simple medium.—J. Keppie.

Bass, C. C. (1941). **Specific Cause and Nature of Ulcerative Enteritis of Quail.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 250–252.

This paper is complementary to an earlier one [*V. B.* **10.** 827]. B. now states that spores of the anaerobic bacilli described cannot be demonstrated in lesion smears, as was previously stated in error. He recommends Brewer's thioglycollate medium stiffened slightly by agar for the isolation of the organism direct from intestinal lesions.

It has been found that coprophagy of fresh droppings is the natural method of infection and that vaccination with cultures of the organism killed by the addition of merthiolate (0·01%) produces strong immunity against inoculation of live cultures.—J. E.

SCHNEIERSON, S. S. (1939). **Effect of Sulfanilamide upon the Shwartzman Phenomenon and upon the Growth of Meningococci in vitro.**—*J. infect. Dis.* **65.** 97–102. [Author's summary copied *verbatim*].

The experiments reported in this paper indicate a strong inhibitory effect of sulfanilamide and prontosil upon the growth of meningococci in vitro. The drugs, which are capable of inhibiting the Shwartzman phenomenon elicited by means of living meningococci, have no effect upon the Shwartzman active principles of filtrates and upon meningococci killed by drying.

HELLER, G. (1941). **A Quantitative Study of Environmental Factors Involved in Survival and Death of Bacteria in the Desiccated State.**—*J. Bact.* **41.** 109–126.

A description is given of experiments carried out by H. to ascertain the suitability of various menstrua for maintaining desiccated *Bacterium coli* and streptococci in a viable state. The menstrua used ranged from simple crystalline substances, such as tryptophane, xylose, and sucrose in 1% solution in triple distilled water, to colloids, e.g. starch, gum tragacanth, gastric mucin, and peptone in 1% concentrations. A mixture of the crystalline and colloid menstrua was also used.

Counts for viable organisms were made on the desiccated samples and on their corresponding control tubes at intervals up to 84 days. H. found that streptococci remained viable for longer periods in the desiccated state than in fluid controls in all the menstrua he used. The reverse was true for *Bact. coli*. No reasons are given for this difference. The death rates for both organisms were found to be highest in the simple menstrua, but where the crystalline substance was one of high solubility which the organism was capable of readily dissimilating in normal fluid culture, there was an appreciable decrease in the death rate. In some of the more complex menstrua the organisms showed only a very low death rate up to 84 days.

The use of glyptal, a quick drying and highly impervious resin, in the sealing of phials of desiccated bacteria was considered to have an important bearing on the results obtained.

—ALEX. THOMSON.

WOOLLEY, D. W. (1941). **Studies on the Nutritive Requirements of Bacteria.**—*J. Bact.* **42.** 155–163.

This article summarizes work carried out by W. and associates. Haemolytic streptococci failed to grow on tryptone liver-extract medium treated with alkali, but normal growth occurred when this medium was supplemented with riboflavin, pantothenic acid, and a suitable reducing compound, such as "reduced" Fe and a number of sulphydryl compounds. The question of anaerobiosis appears to be linked up with the oxidation-reduction potential of the medium rather than with an anaerobic atmosphere, and W. suggests a more suitable definition of an anaerobic organism as one which cannot by itself create an oxidation-reduction potential suitable for initiation of growth. Studies on the growth of group D haemolytic streptococci showed that vitamin B_6 was essential for growth. Seven amino acids are also essential for the growth of this type of organism, although considerable variations in requirements exist between strains. The addition of nicotinic acid leads to more rapid and luxuriant growth. The active fraction of liver extracts for the development of group A organisms has been found to be a water-soluble, heat-stable, non-dialysable compound, basic in nature, the exact composition of which is not yet known. More recently, fat-soluble compounds have been shown to play a role in bacterial nutrition. The part played by bacterial studies in the isolation of pantothenic acid as the chick antidermatitis factor is described. It is becoming more apparent that the same compounds are concerned in the growth of all living cells.—ALFRED EDEN.

KRAUSKOPF, E. J., SNELL, E. E., & MCCOY, E. (1939). **Growth Factors for Bacteria. XI. A Survey of the Pantothenic Acid and Riboflavin Requirements of Various Groups of Bacteria.**—*Enzymologia.* **7.** 327–330. [In English].

It is demonstrated that many propionic acid bacteria require pantothenic acid; the presence of riboflavin was not essential for their growth but in some cases did increase the rate of growth. *Streptococcus distendens* and *Str. mastitidis* required pantothenic acid but not riboflavin while *Str. agalactiae* required both. A large number of miscellaneous organisms including members of the colon-dysentery-typhoid group, the aerobic spore-formers, and the anaerobic spore-formers required neither

pantothenic acid nor riboflavin for growth under the conditions used and, with few exceptions, the rate of growth was not stimulated by the presence of these substances.

—R. ALLCROFT.

GALE, E. F. [Addendum by BROWN, G. L., MACINTOSH, F. C., & WHITE, P. B.] (1941). **Production of Amines by Bacteria. 4. The Decarboxylation of Amino-Acids by Organisms of the Groups *Clostridium* and *Proteus*.**—*Biochem. J.* **35.** 66–80.

Studies were made of the power of washed suspensions of organisms of the *Clostridium* and *Proteus* groups grown in a glucose-casein digest broth, to decarboxylate amino acids. *Cl. welchii*, *Cl. bifermentans*, and *Cl. fallax* decarboxylated histidine to give histamine; *Cl. aerofoetidum* tyrosine to give tyramine; *Cl. septique* ornithine to give putrescine, and *Cl. welchii*, *Cl. aerofoetidum*, and *Cl. bifermentans* glutamic acid to give γ-aminobutyric acid. Optimum pH values for each decarboxylase are given. In glucose broth the organisms have little activity, the decarboxylases developing as the pH of the medium approaches their optimum. Loss of activity before growth ceases may be associated with structural changes of the organism.

In the absence of carbohydrate the decarboxylase activity of the organism depends upon the pH of the medium, high decarboxylase activity being found with low growth pH. The histidine decarboxylase activity of *Cl. welchii* is considerably higher in the presence of fermentable carbohydrate at pH 5. The possible pathogenic significance of histamine production by *Cl. welchii* is discussed.

Later, estimations of the plasma histamine level in cats infected with *Cl. welchii* show that no significant pathological effect is produced by the absorption of histamine from the infected tissue into the bloodstream.—ALFRED EDEN.

BASS, A., BERKMAN, S., & SAUNDERS, F. (1941). **An Additional Growth Factor Needed by Some Hemolytic Streptococci.**—*J. infect. Dis.* **68.** 220–225.

Working with two strains of β-haemolytic streptococci, the authors found that there was no growth in a semi-synthetic basal medium even when recognized additional growth factors, such as glutamine, ascorbic acid, pantothenic acid, and B_6 were added. An additional growth factor, which could be extracted from various tissues and yeast, was investigated, the greatest activity being derived from yeast. Some of the physical and chemical properties are given and the method of fractionation to obtain purification of the factor (or factors) is described in some detail.—ALEX. THOMSON.

CHARLES, V. K. (1940). **A Ringworm Disease of Muskrats Transferable to Man.**—*J. Wash. Acad. Sci.* **30.** 338–344. [Abst. from abst. in *Exp. Sta. Rec.* **84.** 525].

Description is given of a fungus, *Trichophyton*, an infection with which was acquired by an investigator of the Iowa Experiment Station while working with muskrats (*Ondatra zibethica*). The identity of the organisms, one of which was isolated from man and the other from muskrats, was proved by comparative cultural studies.

LUYKEN, P. (1939). Zur Frage der Impftherapie der Strahlenpilzerkrankungen. **[Vaccination against Actinomycosis].**—*Berl. Münch. tierärztl. Wschr.* June 30th. 407–408.

L. records the results of injections with katusan, a thick suspension of living, non-pathogenic, acid-fast bacilli of the Timothy grass group, in the treatment of 358 cases of actinomycotic conditions in cattle and pigs. Doses of from 5–10 ml. were given subcutaneously or intramuscularly at intervals of 8–21 days. Katusan was found most valuable in actinomycosis infection of lymph nodes of the neck (85% of 302 cases cured) and least valuable in actinomycosis of the tongue (50% of 19 cases cured). Of 11 infected pigs, 90% were cured.—D. L. ROBARTS.

BISBOCCI, G. (1938). Contributo allo studio dell'entero-epatite infettiva dei gallinacei. Ricerche micologiche ed anatomopathologiche. **[Infectious Entero-Hepatitis in Fowls Due to a Cryptococcus].**—*Nuovo Ercol.* **43.** 290–314.

B. isolated a cryptococcus from a pheasant with entero-hepatitis. Chickens were infected experimentally and developed the disease. The lesions consisted of granulomas and necrotic processes in the liver, intestines, lungs and spleen. The organism is described in detail.

—MILLER WATSON.

DISEASES CAUSED BY PROTOZOAN PARASITES

KLEINE, F. K. (1941). Ist eine Immunisierung von Rindern gegen die Tsetsekrankheit (Nagana) möglich. [**The Possibility of Immunizing Cattle against Trypanosomiasis**].—*Dtsch. tierärztl. Wschr.* **49.** 299–300.

Methods of immunizing cattle against trypanosomiasis are briefly discussed, some success having been claimed for the modification of trypanosomes by animal passage, the exposure of animals under antimony treatment to tsetse, and the infection of cattle as calves. Although animals immunized by these methods may resist infection with a local trypanosome strain, they remain susceptible, however, to more virulent strains and to other species of the parasite. It is concluded that cattle-raising is possible only in areas free from tsetse flies, and that where nature has failed, man cannot hope to succeed.

[K. appears not to appreciate the varying susceptibility of animals to different trypanosome species, nor that flourishing cattle populations may exist in areas infested by certain tsetse, *e.g.*, *Glossina palpalis*. He even doubts that dogs, goats, and sheep may thrive in " fly " areas in spite of evidence that they do. He also makes the mistake common in research workers of presuming that deaths in experimental animals must be due to the experimental infection.]—U. F. RICHARDSON.

IRIARTE, D. (1941). Tripanosomiasis caballar. [**Trypanosomiasis in Horses**].—*Rev. Med. trop. Parasit., Habana.* **7.** 12–15.

The trypanosome found in horses in Venezuela is described; morphologically it agrees with the description of *T. hippicum* (Darling).

G. pigs, artificially infected, were examined daily; it was found that older animals were fairly resistant. The haematic phases of the disease varied very much from animal to animal. When smears from peripheral blood were negative, heart blood was also negative. G. pigs were killed at the phase when trypanosomes were absent from the peripheral circulation and the organs examined. Trypanosomes could not be found in the cerebrospinal fluid but were found in sections of the spleen, liver, pancreas, lungs, or kidneys.

The period of incubation in g. pigs is 1–2 weeks. In rats and mice it is much shorter, trypanosomes being found in the peripheral blood on the day following inoculation. Rabbits and dogs were also infected experimentally; pigeons and fowls were resistant.

Attempts to cultivate the trypanosome in various media were unsuccessful.

P.M. microscopic examination of an infected g. pig revealed a number of small foci of lymphocytes in the myocardium and pericardium. In the spleen there was some hyperaemia and some increase of connective tissue, along with marked increase in lymphoid tissue. There were small necrotic foci in the liver; the lungs were congested and had lymphoid foci. The kidneys were apparently normal.—MILLER WATSON.

LYFORD, H. S. (1941). **Some Reactions of a Pathogenic Flagellate, *Trichomonas foetus*, to Environmental Changes in Bacteria-Free Cultures.**—*Amer. J. Hyg.* Sect. C. **33.** 69–87.

Trichomonads survived in sealed ampoules containing bacteria-free saline egg blood medium for 99 days at room temperature. Saline albumen cultures were not satisfactory, but whole egg slants and egg-yolk slants were equally suitable. The saline whole-egg blood medium, however, was the best for long-continued cultivation for stock cultures, the organisms appearing to utilize substances from both the yolk and albumen in this medium. The growth factor in rabbit serum utilized *in vitro* by *T. foetus* was stable at 4°C. for at least five months. There was no significant difference in the value of the serum from male and female rabbits, nor from pregnant and non-pregnant females. A 40% serum concentration was the optimum for cultivation of *T. foetus* in dextrose serum broth. Cultures could not be developed successfully from other broth cultures if the growth curve was in a state of decline in the culture used as inoculum. Transference of *T. foetus* from saline egg blood culture to dextrose serum broth was almost impossible if the former culture was more than 72 hours old. When stock cultures were not transferred at the usual ten-day intervals they became increasingly harder to transfer successfully. With the growth of *T. foetus* in dextrose serum broth there was a lowering of the pH, in direct proportion to the number of organisms produced in the culture. The final pH after all

trichomonads had died was 4·8, regardless of the number produced. Death was not the result of a lethal acidity. Metabolic products of old culture filtrates had a definite inhibitory effect on the growth of trichomonads inoculated into new media, even when the filtrate was present in only 1% concentration. In dextrose serum broth, the percentage of organisms containing more than one nucleus remained relatively constant, even showing a slight increase after the time when the maximum count was made.—M. L. BINGHAM.

CHUNG, H. L., WANG, C. W., LEE, C. U., & LIU, W. T. (1939). **A Report on the Examination of 587 Normal Dogs in Peiping for Leishmania Infection.**—*Chin. med. J.* **56.** 364–369. [In English].

The spleen, liver, and skin of 587 apparently normal dogs were examined for evidence of leishmaniasis, which was found to be present in 8 (1·4%) of the animals.

Gross skin lesions typical of canine visceral leishmaniasis of natural occurrence were produced experimentally in a normal dog 22 months after intraperitoneal inoculation with a strain of leishmania isolated from a naturally infected dog in which no lesions were present. —J. E.

MCNEIL, E., HINSHAW, W. R., & KOFOID, C. A. (1941). *Hexamita meleagridis* **sp. nov. from the Turkey.**—*Amer. J. Hyg.* Sect. C. **34.** 71–82.

A brief account of this organism was published in 1938 by HINSHAW, MCNEIL, & KOFOID, but no specific name was given as the investigation was not then completed. The present paper includes a description of the organism, together with details of cross-infection experiments, and a valuable summary of literature relating to *Hexamita* as a pathogenic agent. The results reached by the authors have led them to erect a new species, *H. meleagridis*, for this parasite of the turkey. The new species in an intestinal diplozoic flagellate with average dimensions of $9\mu \times 3\mu$. A severe catarrhal enteritis is associated with this infection in turkey poults. The organism was successfully transmitted to young quail, chickens, and ducklings but no disease was produced, and it seems possible that these birds may serve as carriers of the organism.

—C. HORTON SMITH.

AGRINSKI, N. (1938). **[On Ticks as Transmitters of Horse Nuttalliasis in Central Asia].**—*Acta Univ. Asiae med.* (*8, Zool.*) No. 31. pp. 9. [In Russian: English summary]. [Abst. from abst. in *Rev. appl. Ent.* **29.** 140].

Experiments were carried out in Tashkent in the summer of 1938 to determine whether *Dermacentor niveus*, *Hyalomma marginatum*, and *Rhipicephalus sanguineus* transmit this disease. Female ticks were taken from horses in a locality where the disease was prevalent, kept 1–30 days without food, and then placed on healthy foals which had had no previous contact with ticks. Three specimens of *D. niveus* remained on a foal for 17 days and engorged, but no infection was produced. Foals on which *R. sanguineus* or *H. marginatum* were allowed to engorge became infected, the organisms appearing in the peripheral blood after incubation periods of 8–14 days.

ZIRONI, A., & CARLINFANTI, E. (1941). Ueber die Biologie der Leptospiren, mit besonderer Berücksichtigung der Wachstumregulierenden Faktören. **[Biology of *Leptospira* with Special Reference to Growth - Regulating Factors].** — *Zbl. Bakt. I.* (*Orig.*). **147.** 242–249.

The factors influencing the luxuriance of the growth of leptospiral cultures and the peculiar tendency of these organisms to undergo lysis, are discussed, a brief review of previous findings being given. That the disappearance of leptospira from cultures is not due to exhaustion of the medium was shown by removing the organisms by centrifugation from cultures which had passed their period of maximum growth, and then incubation of the fluid with its persistent organisms at 30°C. After 5–6 days, cultures were obtained as luxuriant as the original ones. This process of removal of organisms, and repetition of cultivation, can be carried out five or six times, but after the sixth, centrifugation growth becomes less luxuriant. It is suggested that a substance is produced by the organisms which inhibits multiplication, and thus prevents exhaustion of the medium, and allows the survival of the leptospira for long periods. After repeated culture and removal of organisms has rendered the medium incapable of supporting luxuriant growth, the inhibitory factor can be overcome by dilution with sterilized tap water, thus proving that the medium itself is not exhausted.

For this growth-limiting factor, or substance, the designation " biostatic complex " is suggested.—U. F. RICHARDSON.

GREENE, M. R. (1941). **A Survey for Leptospirosis in Southern California.**—*Amer. J. Hyg.* Sect. B. **34.** 87–90. [Author's summary copied *verbatim*].

About one fifth of the dogs selected at random in southern California have agglutinins for *L. canicola*. Animals from hospitals show a higher incidence. The rate in the combined group of 368 dogs was 29 per cent. No immune bodies against this strain were found in 100 sera from cats or 426 specimens from human beings.

Antibodies reacting with *L. icterohemorrhagiae* in sera from these dogs were due to cross reactions resulting from infection with *L. canicola*. The sera from one cat and three human beings reacted with *L. icterohemorrhagiae*.

MOCHTAR, A. (1940). Over het voorkomen van leptospira's bij varkens te Batavia. [**Leptospira in Batavian Pigs**].—*Geneesk. Tijdsch. Ned.-Ind.* **80.** 2334–2345. [English summary]. [Abst. in *Bull. Hyg., Lond.* **16.** 175, copied *verbatim*. Signed: H. H. S.]

From the kidneys of 104 pigs in Batavia and its environs the author was able to cultivate six strains of leptospira. None of the strains showed a high degree of virulence for guinea-pigs or white mice. Serological tests showed the strains to belong to the type Pomona and 26 out of 64 sera examined agglutinated this strain in strength of 1 in 100 to 1 in 10,000. [The author states 46 per cent.—the above proportion is 40·6 per cent.—and the table in which the serum reactions are given shows two or three errors.] " Four sera agglutinated the Wijnberg strain (*L. icterohaemorrhagiae*) " [but the same table shows that seven agglutinated in a dilution of 1 : 100, three at 1 in 250 and one at 1 in 500], " one the Salinem strain " [the table shows two] and " one the Rachmat " [the table shows two agglutinating at 1 in 100 and one at 1 in 2,500]. The sera of 25 contacts were also tested and thirteen of them agglutinated the Pomona strain in dilutions ranging between 1 in 100 and 1 in 1,000.

TJHONG, K. T. (1940). Over de positie der leptospiren in de nier bij chronische uitscheiders. [**The Position of Leptospira in the Kidneys of Chronic Carriers**]. —*Thesis, Batavia.* pp. 80. [English summary]. [Abst. from abst. in *Trop. Dis. Bull.* **38.** 481].

T. studied the carrier condition in naturally infected cats, dogs, pigs, and rats, and in g. pigs and white mice which had been made carriers by infection with less virulent strains of leptospira. He found that the leptospira maintained themselves by multiplication in certain parts of the renal cortex, inhabiting groups of contiguous renal tubules which proved, on serial section, to be parts of the same nephron. The clusters of leptospira were found in the distal convoluted tubes only. T. explained this as due to the organisms' being washed from the proximal convolutions and Henle's hoop, by the strength of the urinary flow, into the distal tubules where the relatively weak flow and the irregularities of the course permit them to establish themselves.

SNAPPER, I., CHUNG, H. L., CHU, I., & CHEN, K. C. (1940). **Preliminary Observations on Human, Canine and Murine Leptospirosis in North China.**—*Chin. med. J.* **58.** 408–426. [In English]. [Abst. from abst. in *Trop. Dis. Bull.* **38.** 480].

The authors give details of two cases of *L. canicola* infection in two members of the department of physiology at Peiping Union Medical College, whose work had for some months necessitated the handling of dog's urine. Leptospira were not found, but the blood of both cases agglutinated the Roesel strain of *L. canicola* and the Sumatra strain of *L. hebdomadis* B at 1 : 100,000, but not other strains. Agglutination of *L. hebdomadis* is probably a para-specific reaction often occurring with this strain. The sera of three dogs to whose urine the patients had been exposed also agglutinated *L. canicola* but not other strains.

Altogether five out of 52 dogs examined in Peiping showed evidence of infection, the aggln. titres being 1 : 10,000 in two cases, and 1 : 100, 1 : 1,000, and 1 : 3,000 respectively in the other three. Sera of five out of 68 rats caught in Peiping contained leptospira agglutinins with a titre of 1 : 100 or higher, belonging to three types of leptospira, *canicola* (Roesel), *hebdomadis* A, and *bataviae* (Swart). 172 rats were examined for leptospira with no success.

TERSKIKH, V. I. (1940). [**Leptospirolysins and Agglutinins in Hog's Serum**].—*J.*

Microbiol., Moscou. No. 8. pp. 69–70. [In Russian : English summary]. [Abst. from abst. in *Bull. Hyg., Lond.* **16.** 336].

Leptospira infection was diagnosed in swine-herds who bathed in the same lake as that in which they washed the pigs. By serological tests the organism was identified as " water leptospira type II ". Examination of the pigs' sera showed that they contained the same lysins and agglutinins as did the sera of recovered human patients. The pigs appeared healthy, and no history of jaundice could be obtained. The importance of this, from the public health point of view, lies in the possibility that apparently healthy pigs may be carriers of leptospira capable of attacking man.

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

Köbe, K., & Heinig, A. (1939). Die Bedeutung der Bakterien aus der Paratyphus-Enteritis-Gruppe als Sekundärerreger bei MKS. **[Significance of the Bacteria of the Salmonella Group as Secondary Invaders in Foot and Mouth Disease].** —*Z. InfektKr. Haustiere.* **55.** 189–206.

The investigations were carried out on oxen 3–4 years old used at the Riems institute for the production of F. & M. disease vaccine. Salmonella were isolated from 38 (4·7%) out of 817 cattle after infection with F. & M. disease, and were found in about 10% of all cattle dying as a result of the disease.

About 35% of the Riems cattle infected with F. & M. disease developed diarrhoea between the 4th and 12th day, but only about half those from which the organisms were isolated in this series of cattle had shown this symptom.

The typical pathological change in the intestine was a slight catarrhal inflammation and the organisms were isolated from the intestine or mesenteric lymph nodes of 30%, and from the muscle of 4% of the cases with these lesions. 97% of the strains isolated were *S. typhi-murium*, 2·1% *S. enteritidis* and 0·9% *S. cholerae-suis*.

There was a concurrent infectious bronchitis due to a virus in many of the cattle, but the salmonella infection was shown not to be correlated with this disease.

The possibility of the cattle becoming infected with the salmonella bacilli from an external source was found to be very slight and the presence of the organism in the animal before the F. & M. infection was therefore suspected. Examination of the blood of 912 cattle on arrival at the institute showed that 355 had agglutinins against *S. typhi-murium* and *S. enteritidis* at a titre of 1 : 100, 19 at a titre of 1 : 200, and two at a titre of 1 : 500. The faeces of all these 376 cattle were examined and salmonella were found in 11 of them. The faeces of 46 other cattle with no evidence of agglutinins, but showing symptoms of an enteritis were also examined and salmonella were isolated from three of them. Thus 14 (1·5%) of the 912 cattle were shown to be carriers of salmonella prior to infection with F. & M. disease. Only four of these carriers and 54 (5·9%) other cattle developed clinical symptoms of the specific salmonella infection when infected later with the F. & M. disease virus.—H. H. Skinner.

Lemétayer, E. (1938). La sédimentation sanguine ne peut pas être utilisée pour dépister l'anémie infectieuse chez les chevaux soumis à certaines immunisations. **[The Use of Blood Sedimentation Tests in the Diagnosis of Equine Infectious Anaemia in Horses Immunized against Certain Diseases].**—*Bull. Acad. vét. Fr.* **11.** 148–157.

L. found that the sedimentation rate of the red blood cells of horses used for the production of various antisera was similar to that which occurs about the time of the febrile reactions in the blood of horses with E.I.A. The test cannot therefore be used to diagnose cases of E.I.A. in serum-producing establishments.

In horses undergoing hyperimmunization, the sedimentation rate appeared to be strongly influenced by the injection, *i.e.* increases in the dose of the antigen brought about a corresponding increase in the sedimentation rate.

Further work on horses being immunized against tetanus showed that a constant acceleration in the fall took place during the course of the preliminary injections, but that this decreased during the periods of bleeding and rest. It was found that on control horses these changes were not due to the proteins introduced with the antigen.—J. R. Lawson.

Wittfogel, H. (1939). Ueber die Formol-

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gelatinierungreaktion als Hilfsmittel zur Feststellung der ansteckenden Blutarmut der Einhufer. [**Diagnosis of Equine Infectious Anaemia by the Formol-Gel Test**].—*Z. InfektKr. Haustiere.* **55.** 175–179.

In tests on 13 healthy horses and two healthy asses, on seven horses with chronic E.I.A., and eight horses which had been artificially infected, the formol-gel test for increased blood globulin was shown to be unreliable as a diagnostic aid. Six, two and four positive reactions were obtained in each of these groups respectively.—H. H. SKINNER.

OPRESCU, A. C. (1938). Cercetări clinice şi experimentale asupra tusei contagioase a calului. [**Equine Infectious Bronchitis**].—*Arhiva vet.* **30.** No. 6. 8–34.

O. studied a number of cases of infectious bronchitis in horses and concluded that the disease is identical with *Ansteckende Katarrh der Luftwegen* [*V. B.* **11.** 762]. He found that the virus is present in the blood during the febrile stage, but disappears from the blood with the disappearance of the fever. The disease could be transmitted by contact or by subcutaneous injection of virulent blood. Experimentally the period of incubation is 5–6 days and when there are no complications the course of the disease is 10–15 days. The characteristic symptom is coughing, although the submaxillary lymph nodes may be enlarged and abscesses may form. Strangles or pharyngitis may develop as complications. The disease appears at any season, but is more common and more severe in cold or damp weather. None of the treatments experimented with proved useful, but the death rate is low. Even with careful measures of isolation and disinfection the disease is difficult to control.

O. found that recovered animals were immune, but that their sera did not contain antibodies and are useless as therapeutics.

—MILLER WATSON.

MORGAN, I. M. (1941). **Influence of Age on Susceptibility and on Immune Response of Mice to Eastern Equine Encephalomyelitis Virus.**—*J. exp. Med.* **74.** 115–132. [Author's summary copied *verbatim*].

The experiments described in this paper were carried out with the Rockefeller Institute strain of albino mice and with the Eastern strain of the virus of equine encephalomyelitis.

1. The observation was confirmed that with increasing age of mice there occurred a decrease in susceptibility to intraperitoneal injection of active virus; also, the length of incubation period of those which succumbed increased with age.

2. The mice of various age groups which survived an intraperitoneal injection of active virus were indistinguishable in their antibody response.

3. Young mice, vaccinated with formalin-inactivated virus when 2, 5, and 7 days old, gave an immune response to such a degree that they showed (a) measurable peritoneal immunity which increased with small increments of age, (b) no cerebral resistance, and (c) detectable amounts of neutralizing antibody in their sera which paralleled, though at a considerably lower level, their peritoneal resistance.

4. The peritoneal resistance induced as a result of vaccination was shown to be not local, but a general, systemic immunity, specific for the Eastern strain. Such a peritoneal resistance was demonstrable by the 4th day after beginning of vaccination of 10-days-old mice.

5. After intraperitoneal injection of active virus, large amounts of virus were recoverable from the blood of non-vaccinated young mice; none was found in the blood of vaccinated young mice; a minimal amount was detectable in the blood of non-vaccinated adult mice.

6. The bearing of age on the degree of immune response of which mice are capable and on their susceptibility to the virus has been discussed.

TRAUB, E. (1938). Experimentelle Untersuchungen über einen durch Taubenpassage veränderten Virusstamm der amerikanischen Pferdeenzephalomyelitis. [**Experiments on a Strain of the Virus of American Equine Encephalomyelitis, Changed by Passage through Pigeons**].—*Zbl. Bakt. I.* (*Orig.*). **143.** 7–22.

A strain of E.E. virus (Eastern type) which was originally highly pathogenic for the g. pig was passaged intracerebrally through g. pigs for 25 passages, through rabbits for 22 passages, and through mice for 118 passages without any change of infectivity for the g. pig following peripheral inoculation.

After 25 passages in pigeons, however, it

became a strongly neurotropic strain, and large doses could be used by the subcutaneous route to immunize g. pigs and horses without much danger.

The pathogenicity of this neurotropic strain following the inoculation of g. pigs by various routes was investigated.—H. H. SKINNER.

MANNINGER, R., & CSONTOS, J. (1941). Virusabortus der Stuten. [**Virus Abortion in Mares**].—*Dtsch. tierärztl. Wschr.* **49.** 105–108.

In 1939 the authors investigated abortions in a stud in which half the mares aborted within a short period. They succeeded in procuring abortion in pregnant g. pigs [no details given] by filtered or unfiltered suspension of organs of aborted foals. In 1940 six similar outbreaks were observed. The abortions occurred between the 6th and 11th months of gestation without complications to the mares. The foetuses had the following lesions :– connective tissues icteritic, subpleural and perirenal tissues oedematous and yellow, much yellow fluid in the serous cavities, small haemorrhages under the pericardium, endocardium and intestinal mucosa, kidneys congested and the cortex petechial, liver swollen and dark with necrotic foci under the capsule, and spleen firm with subcapsular haemorrhages. Histological examinations were carried out by SALYI and were published elsewhere [untraced]. They revealed the presence of cell inclusions in the liver lesions, bronchi, and epithelial cells.

Experiments were carried out between the 7th and 9th months of gestation on five pregnant mares, which were given filtered foetal pleural exudate or organ suspension by tube into the pharyngeal cavity (in one mare it was given also intravenously). One mare aborted 26 days later and the foetus showed the changes outlined above. The second mare foaled three months later and the foal was killed and showed histological traces of broncho-pneumonia associated with cell inclusions. The third mare died of an accident and her foal was normal. The fourth mare went for 146 days when her foal was removed by operation : it showed the same changes as the second mare's foal. The fifth mare aborted after 22 days and her foal likewise showed the characteristic lesions. Temperature records revealed transient fever 2–4 days after injection.

By chance another horse not included in the experiment was confined next to one of the above mares and contracted a fever like influenza. This chance observation suggested that this form of abortion is nothing else than a secondary effect of equine influenza. The authors conclude with a discussion on this theory, which has yet to be studied experimentally.—J. E.

BRAGA, A. (1937). Observações e pesquizas em torno da peste suina no Brasil. II. [**Swine Fever in Brazil. II**].—*Bol. Inst. Vital Brazil.* No. 19. pp. 99. [For part I, see *V. B.* **7.** 471].

B. reviews present knowledge of S.F. in Brazil. Several strains of virus have been studied, two of them of high virulence. In cross-immunity tests with virulent strains from other countries the Brazil strains were typical.

The disease normally runs a subacute or chronic course in Brazil and is associated with the usual secondary invaders. B. describes the preparation of vaccines and sera, but objects to the use of the serum + live virus method of prophylaxis on account of the danger of spreading the disease which is not widely disseminated in the country.

The paper is illustrated with a number of photographs and graphs.—MILLER WATSON.

PENSO, G., & ROSA, B. (1938). Sull'esistenza di una particolare affezione morbosa dei suini da virus della malattia dei porcai. Ricerche sperimentali su detto virus. [**Swineherds' Disease in Pigs**].—*R. C. Ist. sanit. pubbl., Roma.* **1.** 77–98.

The authors inoculated pigs with blood from a human case of swineherds' disease and found that the virus of S.D. was pathogenic for these animals. The disease set up may take a chronic or an acute form, and is similar in every respect to a natural disease of pigs noted among animals maintained by cheese creameries. The natural disease had been confused with swine fever but cross-immunity tests carried out by the authors showed that the viruses were separate.

In the acute form of the experimental disease there is a rapid increase in temperature and the pig may die in 4–5 days. In some cases there is posterior paresis and the back is arched and the spine bent to one side. At P.M. examination, haemorrhagic enteritis was found in the acute cases and although the liver was apparently normal the lymph nodes were enlarged and congested. The spleen was

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normal. Externally the kidneys appeared normal, but on section punctiform haemorrhages were found. In some cases there was some slight pericarditis and there were small thickened areas in the lungs. The larynx was congested and cerebral meningitis with petechiae was a marked feature. Microscopically, in the affected part of the small intestine, there was seen considerable cellular infiltration in which eosinophiles predominated. Here and there, there were small ulcers.

The virus also proved pathogenic for rats, rabbits, and sheep, but not for dogs and cats. The virus cannot be cultivated in ordinary media, it is invisible, filtrable, and does not survive long out of the animal body.—M. W.

GRITTI, G. (1938). Un caso di malattia dei porcai. [**A Case of Swineherds' Disease**]. —*Igiene mod.* **31.** 224–228.

A case report. The human being concerned worked for two years in a cheese factory. He was transferred to the piggery of the factory for three weeks and the illness followed this move. There was no evidence of any illness in the pigs.

I. —. (1941). **Report of the Committee on Rabies: U.S. Live Stock Sanitary Association Chicago, 1940.**—*Proc. 44th ann. Meet. U.S. Live Stk sanit. Ass., 1940.* pp. 52–59.

II. —. (1941). **Report of the Committee on Rabies of the American Hospital Association.**—*Ibid.* pp. 219–221.

I. The committee propose a draft of nine regulations for the control of rabies on a local basis. They closely resemble recommendations made by a committee of the American Veterinary Medical Association which works in consultation with the U.S.L.S.S.A. [see *V. B.* **11.** 446]. Both committees advocate Federal-state legislation as the only effective approach to the problem. Also published is a table showing the incidence of rabies in each state in 1939. Over 8,000 animal cases and 30 human cases occurred.

II. By invitation the committee sent this report to the U.S.L.S.S.A. congress. They stress the importance of education of the public and deplore the fact that rabies control is bound up with politics in many states. A suggestion is made for a joint committee to be formed from seven veterinary, medical, and animal welfare bodies in order to provide a stimulus for necessary action.—J. E.

—. (1941). **Skunks as Rabies Vectors.**—*Fort Dodge bio-chem. Rev.* **12.** No. 2. 8–9.

A note on the occurrence of five cases of rabies in horses in Iowa where evidence pointed to transmission by civet cats or by skunks. Reference is also made to cases of rabies which occurred amongst the men and horses of a cavalry troop in Dakota in the "seventies" as a result of bites by civet cats.—N. J. SCORGIE.

GAUTIER, R. (1940–41). **The Preventive Vaccination of Dogs against Rabies. A Critical Review.**—*Bull. Hlth Org. L.o.N.* **9.** 269–326.

This is an exhaustive review of the problem, compiled partly from published articles and partly from replies to enquiries sent to institutes known to prepare vaccines. The position of experimental vaccination as well as practical vaccination is dealt with and the information from the many countries involved is quoted in fair detail.

The value of vaccination in experimental conditions has been recently shown to be low, whilst actual field vaccination has been shown to be apparently of substantial value in the very few countries where its use has been wide enough to supply objective criteria (Hungary, Japan). Mostly, however, it has not been possible to judge its value.

[Since the compilation of this unique review, workers of the Rockefeller Institute of Medical Research have worked out new research possibilities, which may revolutionize the whole future of rabies prophylaxis—see *V. B.* **11.** 690, 691 and 861.]—J. E.

WEBSTER, W. J., MCGUIRE, J. P., STEPHENS, E. D., & LAHIRI, B. N. (1940). **Prophylactic Anti-rabic Vaccine for Animals.** —*Indian med. Gaz.* **75.** 349.

In an experiment to ascertain the relative prophylactic values of a proprietary one-dose vaccine and the Kasauli seven-dose vaccine on dogs, it was found that the latter was superior. —J. R. HADDOW.

VERLINDE, J. D. (1939). Encephalitis bij den hond. Een vergelijkend-pathologisch onderzoek naar de aetiologie van de z.g. post-infectieuze encephalitides. [**Encephalitis in the Dog. A Comparison of the So-Called Post-Infectious Types of Encephalitis**].—*Thesis, Utrecht.* pp.

142. [English, French and German summaries].

After a review of the literature on encephalitis in animals and man, V. describes his investigations on a form of encephalitis in dogs in Holland which is not associated with dog distemper and appears to be a specific virus infection.

Ninety-two cases were studied as well as many cases of dog distemper and a questionnaire was sent to 150 Dutch veterinary surgeons. The disease was limited to the region of towns, being almost unknown in the country. It affected all breeds and could occur at any age, though most cases were from 3–24 months old. It was not seasonal. Clinically, the disease indicated involvement of the brain alone in some cases, and of the spinal cord alone or of the whole central nervous system in others, and occurred in dogs both immune against and uninfected by the distemper virus.

The P.M. changes, in addition to inflammation of the brain, spinal cord, and meninges, included swelling of the spleen and liver. No inclusion bodies were to be seen in any organ.

Many attempts were made to isolate a filtrable virus. A number of strains were recovered from the c.n.s. of fatal cases and were inoculated intracerebrally into dogs but only one strain capable of preservation in serial passages in dogs was obtained. It was of low pathogenicity and only caused the disease by intracerebral inoculation. After about eight passages it became fixed and reproduced the disease after an incubation period of 10–14 days. Its identity with other known viruses was not studied. It was found that infection could be set up by intranasal instillation if subtoxic doses of guanidine were previously given. Cowpox virus was also shown to be capable of causing encephalitis after guanidine administration, thus indicating a connexion between the liver and the c.n.s.

The specific encephalitis responded to treatment with a vitamin mixture (" pernaemon "). —J. E.

PARKER, R. F., BRONSON, L. H., & GREEN, R. H. (1941). **Further Studies of the Infectious Unit of Vaccinia.**—*J. exp. Med.* **74.** 263–281. [Authors' conclusions copied *verbatim*].

A study has been made of the comparative virulence of several strains of vaccine virus for a number of hosts, and wide variation in animal susceptibility has been demonstrated. The results obtained in experiments with a chick-embryo-adapted strain are interpreted as indicating that the particles of virus are of essentially uniform virulence. Results of statistical analyses are presented which indicate that as the virulence of a strain of virus increases the number of elementary bodies per infectious unit approaches 1, and at that limit the chance of infection is governed primarily by the presence or absence of virus in the inoculum. With lower virulence the chance of a lesion following inoculation of virus is still described by the binomial theorem, but the actual distribution is primarily of susceptible cells not of viral particles. It is postulated that with regard to the proportion of cells available for parasitism, differences exist between different animals of a species, and that this distribution is of a normal character.

HOAGLAND, C. L., WARD, S. M., SMADEL, J. E., & RIVERS, T. M. (1941). **Constituents of Elementary Bodies of Vaccinia. V. A Flavin Associated with the Purified Virus.**—*J. exp. Med.* **74.** 133–144. [Authors' conclusion copied *verbatim*]. [For previous parts, see *V. B.* **12.** 26].

Suspensions of purified elementary bodies of vaccinia exhibit fluorescence in the presence of ultraviolet light. This fluorescent constituent can be separated by chromatographic methods provided the virus is first denatured by acid and heat. By means of the specific protein of *d*-amino acid oxidase it has been possible to identify the flavin constituent as flavin-adenine-dinucleotide and show that it can participate in the oxidative deamination of *d*-alanine. By means of microbiological assay the flavin component has been quantitatively measured and shown to compare favorably in concentration with that observed in animal cells and in some bacteria ; its concentration in virus is lower than that observed in yeast. The demonstration that it exists as an integral portion of the virus is not conclusive. So far, however, it has been separated from the elementary bodies only by means which in themselves inactivate the virus.

NOMLAND, R. (1940). **Human Infection with Ecthyma Contagiosum, a Virus Disorder of Sheep. Report of Two Cases.** —*Arch. Derm., Chicago.* **42.** 878–883.

Cases of apparent transmission of the virus

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of contagious pustular dermatitis of sheep to man have already been reported [see PETERKIN —*V. B.* **10.** 671, and SCHOCH—*V. B.* **10.** 762].

N. describes two instances in which lesions appeared on the hands shortly after infected lambs had been handled.—R. E. GLOVER.

BALLS, A. K., JANSEN, E. F., & AXELROD, B. (1940). **A Chemical Study of the Virus of Infectious Myxomatosis.**—*Enzymologia.* **8.** 267–272. [In English].

A method is described for the purification and concentration of the virus from crude extracts of tumours collected from rabbits previously injected with active myxoma virus. In the process of purification it was found that a dialysable stabilizing factor was present in myxoma tissue and that the same or a similar factor was also present in normal tissue and in commercial meat extract. By keeping the virus in contact with a salt solution containing this stabilizing factor, it was possible to concentrate the virus in an ultracentrifuge. The infectious material concentrated by ultracentrifugation obviously contains the cause of the disease; no definite proof of this connexion is claimed but no centrifugal sediment could be recovered from normal rabbit tissues and the concentrated virus contained at least one chemical constituent not found in normal rabbit muscle, *viz*, a lipoid. This lipoid is therefore considered a part either of the cause or of the effect of the disease. The chemical behaviour of the concentrated virus is discussed and it is thought that the lipoid extracted from the dried concentrated virus consists of a base bearing nitrogen and phosphorus and a steroid that is not cholesterol but possesses some acidic properties.

—R. ALLCROFT.

SYVERTON, J. T., HARVEY, R. A., BERRY, G. P., & WARREN, S. L. (1941). **The Roentgen Radiation of Papilloma Virus (Shope). I. The Effect of X-Rays upon Papillomas on Domestic Rabbits.** —*J. exp. Med.* **73.** 243–248.

SYVERTON, J. T., BERRY, G. P., & WARREN, S. L. (1941). **The Roentgen Radiation of Papilloma Virus (Shope). II. The Effect of X-Rays upon Papilloma Virus in Vitro.**—*Ibid.* **74.** 223–234.

[Authors' conclusions copied *verbatim*].

I. Virus-induced papillomas (Shope) on domestic rabbits are susceptible to Roentgen rays. The dosage which uniformly brings about their complete and permanent disappearance has been found to be 3600 r (200 kilovolts), whether this dose be administered at one time or fractionally. 60 per cent of the tumours are cured when irradiated with 3000 r.

II. Cell-free suspensions of papilloma virus (Shope) required for their inactivation *in vitro* amounts of Roentgen irradiation that are much greater than those needed to inactivate other infectious agents previously described. These amounts, millions of r units, are several thousand times greater than those required to eradicate permanently papillomas induced by the virus in domestic rabbits. Large doses of Roentgen radiation reduce the titer of papilloma virus, lengthen the period of time between inoculation and the appearance of papillomas, and decrease the size attained by the papillomas

RUDD, G. V., & BURNET, F. M. (1941). **Intranasal Infection of Mice with the Virus of Psittacosis.**—*Aust. J. exp. Biol. med. Sci.* **19.** 33–38.

The authors report that when small infective doses of psittacosis virus are administered intranasally to mice, discrete foci of consolidation develop which are scattered throughout the lungs. These foci can readily be counted, thus providing an accurate method of titrating the virus.

This method of estimating virus activity was used in investigations which gave the following results. Sulphanilamide and sulphapyridine had no influence on the infection. No increase in resistance to infection by the intranasal route was conferred by attempts at immunization by (a) intraperitoneal inoculation of formolized virus, (b) subcutaneous inoculation of living virus, or (c) intranasal inoculation with either formolized virus or living virus at limiting dilutions. Immunisation, however, with formolized virus produced an increased resistance to infection by intraperitoneal injection. Exposure of the virus to immune g. pig serum or to human convalescent serum *in vitro* did not reduce its activity. The resistance of this virus to antibody is perhaps correlated with its epidemiology, for it must be able to survive for at least a year in the bodies of recovered, immune hosts before passing to fresh, susceptible young birds.—W. I. B. BEVERIDGE.

COLES, A. C. (1941). **The Size and Visibility**

of the Filterable or Virus Bodies.—*Brit. med. J.* Oct. 11th. 507–509.

C. states that microscopes in common laboratory use should, if properly used, reveal particles with a diameter as small as 0·08μ in white light. He states that after staining with Giemsa, foot-and-mouth disease virus particles can be seen, and they have a diameter of 0·15–0·3μ. Poliomyelitis virus particles are also said to vary in size from 0·15–0·3μ after staining.

C. concludes that when they are stained, all the virus bodies are easily visible within the range of the ordinary microscope. He admits that staining may increase the apparent size of particles, but points out that bacteria are usually observed in the stained condition and contends that viruses should be studied in the same way.

[In the absence of direct evidence that the particles observed by C. were the actual virus particles, these findings must be treated with considerable reserve.]—JOHN FRANCIS.

KRUEGER, A. P., & PUCHEU, H. (1941). **Thermal Inhibition of Phage Production in Mixture of Phage and Growing Susceptible Bacteria.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 210–213.

The question of how bacteriophage is formed is briefly discussed. It is pointed out that if the precursor theory is correct and if bacterial growth and 'phage formation are not related as cause and effect, it should be possible to select an environment for the 'phage-bacterium reaction in which cellular reproduction progresses normally while 'phage formation does not occur, either because of destruction of precursor or inhibition of precursor synthesis. This was attempted by carefully selecting the temperature. A mixture of 'phage and staphylococci in nutrient broth of pH 7·4 was placed in a water-bath shaker maintained at a temperature of 42·3°C. Samples were removed every 15 min. for determining the total bacteria, the viable bacteria, and the amount of 'phage. Within 1½ hours the bacteria increased 450%, but there was no detectable rise in 'phage during this period and consequently the suspension did not lyse. It is concluded that this result depends upon inhibition of the precursor-producing mechanism of the cell rather than upon thermal destruction of 'phage or 'phage-precursor.—R. ALLCROFT.

KUROTCHKIN, T. J., & WYCKOFF, R. W. G. (1941). **Immunizing Value of Rickettsial Vaccines.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 223–228.

The authors report favourable results with two experimental vaccines against infection of g. pigs with rickettsia of human exanthematic typhus, one prepared from organisms harvested from the surface of agar slopes on which infected tissue cultures had been made, and the other from the embryonic membranes of fertile fowl eggs infected in the yolk sac. In each case the rickettsial material was made into a vaccine by the addition of formalin and phenol. Tests on g. pigs indicated that these vaccines were both capable of immunizing them against the inoculation of ordinary virulent organisms.
—J. E.

IMMUNITY

WONG, S. C., & OUYANG, G. (1940). **Studies on Stability of Dilute Purified Tuberculins.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 83–86.

Solutions of P.P.D. as dilute as the first dose of the Mantoux tests, *i.e.* 0·00002 mg. in 0·1 ml., have been found to retain their potency for at least four months at 20°C. and six months at 8°C. when dissolved in saline buffered to pH 7·0 and brought to 0·5% phenol concentration. The tests were made on 20 young human subjects, intracutaneous injections of the stored solution of P.P.D. in one arm being compared with similar injections of freshly made solution in the other.—H. H. GREEN.

BIANCHI, C., & MORELLO, E. (1940). Studi e rilievi sulle reazioni termico-allergiche nella prova classica alla tubercolina—tubercoline ed "esotubercoline" nella profilassi della tuberculosi bovina. **[Thermo-Allergic Reactions in Tuberculin Tests].**—*Profilassi.* **13.** 1–6. [English, French, German and Spanish summaries].

Using Finzi's exotuberculin intramuscularly, the authors tested a number of cattle. There were 1,810 positive reactions and it was noted that the diagnostic rise in temperature could be observed six hours after inoculation in 23·14% of these. At the eighth hour more

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than 55% of these animals had diagnostic temperatures, 88·92% at the 12th hour, 95·43% at the 14th hour, and 98·23% at the 16th hour. In no case was the temperature diagnostic at or after the 18th hour.—M. W.

Mauro, G. (1939). Contributo allo studio della interagglutinabilità fra Brucelle e Pasteurelle. [**Cross Agglutination of Brucella and Pasteurella**]. — *Nuovo Ercol.* **44.** 104–114.

Using a variety of brucella and pasteurella antisera and antigens, M. made a number of cross-agglutination tests.

With brucella antisera and pasteurella antigens there was in most cases no agglutination except at very low titres (1 : 25), but one strain of *Past. boviseptica* was agglutinated by almost all the sera at titres varying from 1 : 400–1 : 800. A brucella antiserum from a fowl agglutinated most of the pasteurella antigens at titres of 1 : 50–1 : 100. The sera were then heated to 56°C. for 30 min. and the tests repeated. With the exception of the fowl serum, the heating destroyed any ability to agglutinate pasteurella in every case.

With pasteurella antisera and brucella antigens of R strains, agglutination was observed in several cases at titres up to 1 : 200. After being heated to 56°C. for 30 min., however, the sera failed to agglutinate brucella or else the titres were very much reduced. With S strains, no agglutination, or agglutination only at low titres (1 : 25), was observed.

M. concludes that there was no positive evidence of cross-agglutination and he explains the agglutination of the *Past. boviseptica* strain on the grounds of dissociation. The behaviour of the fowl serum in agglutinating pasteurella antigens is explained by the tendency of fowl serum to precipitation, as recorded by Beller & Latif (1929) and Beller & Stockmayer (1933).—Miller Watson.

Pagnini, U. (1939). Contributo allo studio della termoprecipitodiagnosi nell'aborto da Brucelle dei bovini. [**Diagnosis of *Br. abortus* Infection in Cattle by the Precipitin Test**].—*Nuovo Ercol.* **44.** 81–96.

P. carried out a number of experiments on the diagnosis of *Br. abortus* infection in cattle by the precipitin test, using extract of the placenta of the suspected animal as antigen and anti-brucella serum produced by rabbits. Details are given of the technique. The results were not consistent.—Miller Watson.

Henriksen, S. D., & Heidelberger, M. (1941). **Chemical Studies on Bacterial Agglutination. VI. The Agglutinin Content of Antisera to Hemolytic Streptococci.**—*J. exp. Med.* **74.** 107–114. [Authors' summary copied *verbatim*]. [For previous parts, see *V. B.* **8.** 164].

1. Application of the quantitative agglutination procedure to hemolytic streptococci and their antisera is shown to yield values indicative of the antibody content of the antisera in weight units. 2. Estimations are given of type-specific and group-specific antibody in a number of antisera. 3. An incomplete analysis is given of the antigenic components and antibodies involved in the agglutination. 4. Adaptation of the experimental conditions to a simple qualitative type determination of hemolytic streptococci is suggested.

Boyd, W. C. (1941). **Influence of Character of Antibody upon Velocity of Flocculation.**—*J. exp. Med.* **74.** 369–386. [Author's summary copied *verbatim*].

Results of a thorough study of the rates of flocculation of 20 antisera when mixed with their antigens in all proportions are presented. The relation between the α (constant antibody) and β (constant antigen) optima is discussed. It is suggested that most of the antisera examined can be classified into two main types, one of which, the H type, gives an optimum by both the α and β procedures, whereas the R type gives an optimum only by the former technique. It appears that these differences can only be accounted for by the influence of differences in the physical and chemical properties of the various antibodies.

Platt, A. E. (1941). **Observations on the Role of Sodium Chloride in the Agglutination of Bacteria by Antibody.**—*Aust. J. exp. Biol. med. Sci.* **19.** 57–67.

P. studied the effect of salt concentration on the agglutination of *Salmonella typhi* by *S. stanley* antiserum and of *Br. abortus* by homologous bovine serum. For each mixture of suspension and antiserum there is a concentration of salt which produces optimum flocculation. This concentration approximates to that at which maximal absorption of antibody occurs. The highest end-point titre is obtained

with the salt concentration which is optimal for the smallest sensitizing dose of antibody.

The serological optima may show variation in the serum-suspension ratio with change in salt concentration. When antisera or normal serum proteins are absorbed by organisms in the absence of salt, they produce a fall in the electrokinetic potential at the surface-water interface. In the presence of salt, only antiserum is absorbed in appreciable amounts, which are dependant on the relative concentrations of salt and antibody.—W. I. B. B.

WASSERMAN, P. (1941). **The Rate of Complement-Formation in Dogs.**—*J. Immunol.* **40.** 281–287.

The amount of circulating complement in dogs was reduced by 50–83% by repeated bleeding and replacement of the blood with washed cells and inactivated plasma, or washed cells plus acacia and saline. The complement titre returned to normal within 14–66 hours; in the majority of experiments this occurred within 24 hours. The rate did not depend on the fluid used for reinjection and was independent of the rate of formation of serum proteins.—JOHN FRANCIS.

VAN DER SCHEER, J., WYCKOFF, R. W. G., & BOHNEL, E. (1941). **The Antigenicity of Chick Embryo.**—*J. Immunol.* **41.** 391–395.

Vaccines containing both whole chick-embryo tissue, and the yolk membrane only have been extensively used in human medicine without any harmful effects.

Tests in g. pigs showed that anaphylactic shock could be produced by entire chick-embryo tissue, but that the membranes alone were much less antigenic. It is concluded that although no serious difficulty is to be anticipated if whole chick-embryo tissue is used, vaccines containing membrane tissue only are preferable.—JOHN FRANCIS.

BARR, M., GLENNY, A. T., POPE, C. G., & LINGGOOD, F. V. (1941). **Preparation of Alum-Precipitated Toxoid for use as an Immunising Agent.**—*Lancet.* **241.** 301–303.

Evidence obtained by the authors suggests that precipitating a toxoid with alum (A.P.T.) increases its immunizing effect on the g. pig as much as a hundredfold. The advance in knowledge of the properties of A.P.T. has been so rapid and so recent, and publication of the details has been so incomplete and scattered that this article has been written to clarify the position. Those interested in the recent technique of preparing and testing A.P.T. should consult the original article.—J. FRANCIS.

COONS, A. H., CREECH, H. J., & JONES, R. N. (1941). **Immunological Properties of an Antibody Containing a Fluorescent Group.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 200–202.

As conjugates prepared by the interaction of isocyanates of polynuclear aromatic hydrocarbons with several proteins have been shown to be highly fluorescent, it was thought that fluorescence might be easier to distinguish than coloured groups formed by antibodies conjugated with azo compounds; MARRACK (1934) demonstrated that homologous organisms were specifically coloured pink by these chemically modified antibodies. A β-anthryl-carbamido derivative of antipneumococcus III rabbit serum was prepared and shown to retain the original immunological properties of the antibody while at the same time rendering type III pneumococci specifically fluorescent in ultraviolet light.—R. ALLCROFT.

I. MADINAVEITIA, J. (1941). **Diffusing Factors. 7. Concentration of the Mucinase from Testicular Extracts and from *Crotalus atrox* Venom.**—*Biochem. J.* **35.** 447–452. [For previous parts, see *V. B.* **11.** 384].

II. MADINAVEITIA, J., & QUIBELL, T. H. H. (1941). **Studies on Diffusing Factors. 8. The Reduction of the Viscosity of Vitreous Humour Preparations by Ascorbic Acid and some Diazo Compounds.**—*Ibid.* 453–455.

III. MADINAVEITA, J., & QUIBELL, T. H. H. (1941). **Diffusing Factors. 9. The Effect of Salts on the Action of Testicular Extracts on the Viscosity of Vitreous Humour Preparations.**—*Ibid.* 456–460.

IV. MEYER, K., & CHAFFEE, E. (1941). **The Mucopolysaccharides of Skin.**—*J. biol. Chem.* **138.** 491–499.

I. It has been suggested [see *V. B.* **11.** 381, 384 and 616] that diffusing factors are mucinases. Details are now given of a convenient method of purification of mucinase by $(NH_4)_2SO_4$-fractionation of aqueous testicular extracts followed by lead acetate precipitation under controlled pH. The enzyme can also be

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purified by dilution of NaCl extracts of testicle with water when the whole of the mucinase and the diffusing factor present in the original extract are precipitated with the protein as the electrolyte concentration is decreased.

There is evidence that the diffusing factor and the neurotoxic constituents of *Crotalus terrificus* are different [see *V. B.* **11.** 384]. The mucolytic action of *C. atrox* venom is now shown to be due to a more thermolabile constituent than either the protease or the lecithinase of this venom. Concentration of the mucinase from this venom has been carried out by $(NH_4)_2SO_4$-fractionation and by adsorption methods.

II. The observations of McCLEAN & HALE and of FAVILLI [see *V. B.* **11.** 382.], which indicated that the viscosity of mucin preparations is decreased by ascorbic acid and diazo compounds, have been confirmed. The effect of the concentration of ascorbic acid on the time required to bring about a given decrease of the viscosity of vitreous humour preparations does not follow the same law as testicular extracts or snake venom and it is therefore unlikely that the mechanism of the reactions is similar. Phenylhydrazine also has the effect of lowering the viscosity of mucins in a manner similar to that of ascorbic acid and diazo compounds. As the action is much more marked in the presence of H_2O_2, it is possible that small amounts of diazobenzene formed by oxidation are responsible for the decrease in the viscosity.

III. An investigation was carried out on the effect of salts on the reaction in which the viscosity of vitreous humour preparations is destroyed by the action of testicular extracts. It was found that the time required to reduce the viscosity of vitreous humour preparations to half its original value is inversely proportional to the concentration of testicular mucinase present in the reacting mixture, provided that the reaction is carried out in the presence of NaCl. At low concentrations of salt this time decreases very rapidly as the concentration of enzyme increases.

IV. It has recently been suggested that hyaluronidase and spreading factor are identical [see *V. B.* **11.** 616]. This supposition postulates the existence of hyaluronic acid or a closely related substance in skin. In the present work a muco-polysaccharide mixture was obtained from pig skin; this mixture was separated by enzymatic hydrolysis and by fractionation into two components. One was shown to be identical with hyaluronic acid. This is taken as additional evidence for the identity of the diffusing factor and hyaluronidase. The second component contained hexosamine, acetyl, a uronic acid, and a sulphuric acid in equimolecular ratios.—R. ALLCROFT.

I. McCLEAN, D. (1941). **"Substance B" of Diphtheria Toxin and Diffusing Factor.**—*Lancet.* **240.** 595–596.

II. McCLEAN, D. (1941). **The Capsulation of Streptococci and its Relation to Diffusion Factor (Hyaluronidase).**—*J. Path. Bact.* **53.** 13–27.

III. McCLEAN, D. (1941). **Action of Diffusion Factors on Tissue Permeability.**—*Lancet.* **240.** 797–798.

I. O'MEARA [*V. B.* **11.** 612] recently suggested that diphtheria toxin is composed of two substances A and B and that substance B has properties similar in many respects to those of the diffusion factor. In an attempt to determine whether there was any connexion between substance B and hyaluronidase or diffusion factor, 50 strains of *Corynebacterium diphtheriae* (15 gravis, 13 intermediate, and 22 mitis strains) were examined for diffusing and hyaluronidase activity. Only two gravis, one intermediate, and three mitis strains produced significant diffusion in the skin at a dilution of 1 : 2 of the culture supernatant fluid. Saline extracts of those strains that did not produce the enzyme in broth culture showed little or no diffusing activity. The amount of the enzyme produced by any strain was very small as compared with that found in cultures of organisms of the gas-gangrene group, of streptococci, staphylococci, or pneumococci. Thus no evidence was obtained of any association between diffusing factor or hyaluronidase and substance B postulated by O'MEARA to be present in toxic diphtheria filtrates.

II. A study was made of the production by streptococci of capsules and of the enzyme hyaluronidase; their relation to each other and the part they play in determining either the virulence or invasiveness of the organism was investigated. It was found that some strains of *Streptococcus pyogenes* develop capsules in young culture while others produce hyaluronidase, which if not identical, is very closely related to diffusing factor. None of the strains examined produced both capsules and diffusing factor at the same time; it appears that they

cannot coexist in the same culture, as hyaluronidase either prevents the development of capsules or destroys them when they are formed. Inclusion of hyaluronidase in the medium prevented the appearance of capsules. It was demonstrated that the capacity to form capsules or hyaluronidase is not confined to members of one Lancefield group. The capsules of both group A and group C strains are composed of the same polysaccharide, hyaluronic acid. All group B strains examined produced hyaluronidase and only one developed typical capsules; these capsules were not affected by hyaluronidase and are not, therefore, composed of hyaluronic acid. Hyaluronidase-producing strains responded to the inclusion of hyaluronic acid in the medium by a considerable increase in the formation of hyaluronidase. This response is similar to that already described for *Clostridium welchii* [see *V. B.* **11.** 618]. It is suggested that this response may be of importance in the extension of infections by streptococci and other organisms which produce this enzyme. Virulent type I pneumococci produced hyaluronidase and responded in the same way as streptococci to the inclusion of hyaluronic acid in the medium. Unlike the streptococci, this organism produces both capsules and hyaluronidase and the capsules are not destroyed by either pneumococcal or streptococcal hyaluronidase, but pneumococcal hyaluronidase destroys streptococcal capsular substance. Although there is a close chemical similarity between these two capsular substances, only the streptococcal one which contains glucuronic acid, is attacked by hyaluronidase; this is additional evidence of the strict specificity of its action.

The respective parts that may be played by capsules and by hyaluronidase in streptococcal infection are discussed.

III. A survey is given of the mechanism of the diffusion effect and the part played in bacterial infections by diffusing substances. The work discussed has already been abstracted [see *V. B.* **11.** 381–385, 612, 616–619 and preceding absts]. It is not suggested that the elaboration of diffusing substance or hyaluronidase explains the invasiveness of certain organisms as it is obviously only one of many factors involved which vary with each infection. But the group of enzymes which influence the spreading of an infection and are concerned in the phenomenon of inflammation, and capillary permeability, probably do influence the behaviour of invasive organisms in the tissues and thus play a part in the infection of wounds which should not be ignored.—R. Allcroft.

von Behring, O. (1941). Beitrag zur Kenntnis des Reynalsschen Diffusionsfaktors. [**Contribution to a Knowledge of the Reynals Diffusing Factor**].—*Z. Immun-Forsch.* **100.** 1–18.

In investigations into the nature of the diffusing factor the author found that rabbit testicle extract caused most diffusion, then rat, bull, and g. pig in descending order. The strength of the diffusing factor was maintained for several weeks when the extract was mixed with a disinfectant (mercury thiosalicylate 1 : 10,000) and stored on ice. Rivanol and vuzin were tested for their diffusion activity but none was found. An extract of a strain of *Clostridium welchii* (Sordelli 107) was found to be as active as testicle extract, but *Salmonella enteritidis* had no diffusing activity either in its culture filtrate or in an endotoxin prepared by Boivin's technique. Observations were made on the stability of testicle and *Cl. welchii* extracts at different temperatures.

An anti-diffusing factor was found to be present in *Cl. welchii* serum in considerable quantity only slightly below its antitoxin content. McClean (1936) made similar observations. Serum and toxin were mixed in varying proportions and, after half an hour, were injected with saline and trypanblue into rabbits, when sufficient antitoxin was used to neutralize the dose of toxin, the diffusing effect was largely destroyed. Heating to 80°C. destroyed the anti-diffusing factor but it was unaffected at 70°C. It is therefore, for an antibody, relatively stable. Serum was separated into euglobulin, pseudoglobulin and albumin and the three fractions tested for anti-diffusing factor which was found to be uniformly contained in the euglobulin and pseudoglobulin fractions.

Anti-diffusing factor contained in *Cl. welchii*, *Cl. chauvoei*, and *Cl. septicum* sera were completely specific, each having no effect on the diffusing factor of the other two species, or on testicle extract or snake venom. The author confirms the observations of Madinaveitia [*V. B.* **11.** 384.] on the occurrence of two phases of diffusion after injection of snake venom. An antibody to the very pronounced diffusing factor in snake venom appears to

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occur in antivenin, even if only in very small quantities. No antibody to rabbit-testicle diffusing factor could be demonstrated in the serum of a rabbit which had received, over a period of six weeks, six injections of bull testicle extract. The serum of this rabbit also had no effect on *Cl. welchii* toxin, and the rabbit itself showed no increased resistance to the injections of testicle extract, or to *Cl. welchii* diffusing factor. The author concludes that, in view of their antigenic relationships and varying heat stability, the various diffusing factors can with difficulty be considered as a single substance; it probably consists of the same effective grouping, which is, however, combined with varying temporarily antigenic substances.—R. Allcroft.

I. Rocha e Silva, M., & Dragstedt, C. A. (1941). **Nature of the Capillary Permeability Factor Present in Extracts of Normal Tissues.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 303–306.

II. Menkin, V. (1941). **Note Concerning the Mechanism of Increased Capillary Permeability in Inflammation.**—*Ibid.* **47.** 456–460.

I. In an attempt to establish the identity of the capillary permeability factor, saline extracts were prepared of lung, liver, and muscle tissue from g. pigs, dogs and rabbits and assayed for their histamine-equivalent content. A solution of histamine acid phosphate of the same activity as the extract was prepared and both extract and histamine solution were injected into the abdominal skin of rabbits; a few minutes afterwards, trypanblue was injected into an ear vein and the intensity of colouration of the respective areas was compared at intervals up to 30 min. after the trypanblue injections. The results showed that in general the ability of an extract to produce a trypanblue reaction can be accounted for by the histamine activity of the extract. As rabbit's blood contains a large amount of histamine in comparison with that of g. pigs or dogs, serum from the three species was studied. Rabbits serum gave markedly positive trypanblue reactions, g. pig serum was usually negative, while dog serum gave a mild reaction. This last result could not be accounted for by its histamine-equivalent content. It was also demonstrated that the capillary permeability factor can survive boiling with concentrated HCl. Menkin [*V. B.* **9.** 406.] has shown that inflammatory exudates of various kinds have the property of increasing capillary permeability and he ascribed this property to a specific substance termed "leukotaxine". From the above results the authors conclude that there is no need to postulate a specific factor in tissues which has the property of increasing capillary permeability, as in most cases this phenomenon can be accounted for by the histamine content of the tissues.

II. Evidence is presented which contradicts the theory of Rocha e Silva & Dragstedt [see I] that histamine is responsible for increasing capillary permeability, and experiments are described which demonstrate that leukotaxine is the primary factor concerned in the mechanism of increased capillary permeability in inflammation. Exudates were dialysed for 18–20 hours against distilled water allowing the outward diffusion of leukotaxine or the permeability factor and also of any histamine which is present in the exudate. The indiffusible residual material, when introduced into the skin of a rabbit was found to be incapable of inducing the characteristic pattern of accumulation of trypanblue from the circulation. When leukotaxine was added the exact original effect of the undialysed exudate was readily reconstituted. This effect was not obtained by adding histamine to the residual material in the concentration in which histamine is recovered from exudates.—R. Allcroft.

PARASITES IN RELATION TO DISEASE [GENERAL]

Schmid, F. (1940). Zur Uebertragungsmöglichkeit von Parasiten zwischen Haustieren und Wild. **[Transmissibility of Parasites between Domestic and Game Animals].**—*Dtsch. tierärztl. Wschr.* **48.** 638–639.

S. summarizes the occurrence of various parasites in domestic ruminants and in roe deer, red deer, hares, and rabbits. He concludes that transmission of the principal stomach worms is possible between cattle, sheep, goats, roe deer, and red deer. The trematodes (especially the liver fluke) and cestodes (*Moniezia*) occur in both domestic and game animals, but can only be transmitted through an intermediate host. Of the lungworms the only possible

transmission is of *Dictyocaulus viviparus* between cattle, roe deer, and red deer. Coccidia appear to be host specific. It was not certain whether the trichomonads found in deer and in cattle are distinct species.—H. E. Harbour.

(1941). **Supplement to the Report of the Sixteenth Annual Meeting of the American Society of Parasitologists. Report of the Committee on Nomenclature.**—*J. Parasit.* **27.** 279–282.

In the opinion of the committee, the name *Trichuris* Roederer, 1761 should be accepted as correct; *Trichocephalus* of various authors and *Trichocephalos* Goeze, 1782 become synonyms. The committee also considers that the correct name of the kidney worm of carnivores is *Dioctophyma renale* (Goeze, 1782). The generic name *Eustrongylus* and the specific names *visceralis* and *gigas* fall into synonymy. —M. L. Bingham.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

Bartels, E. (1939). Ein Streifzug durch die Bekämpfung der Dasselfliegenplage. [**A Survey of Warble-Fly Control**].—*Z. SchädlBekämpf.* **31.** 65–76. [Abst. in *Rev. appl. Ent.* **27.** 165, slightly amended].

B. briefly reviewed the development of the problem of warble-fly control in Germany and quoted a regulation dated March 18th, 1938, prescribing that all larvae of *Hypoderma bovis* and *H. lineatum* infesting cattle should be killed in the period from February to May 31st. He stated that up to 1937 control was generally unsatisfactory, and emphasized the necessity of further studies on the bionomics of the flies. The only available control measure was destruction of the larvae, the best insecticide being a suspension of derris in soap solution, which kills the larvae at any stage of development of the warbles. The derris root should yield 8% rotenone and 25% residual extract, two applications of a 2% suspension, with a two-day interval, being more effective than a single application of a 4% suspension. Removal of the larvae mechanically was advised only in slight infestations in small herds.

Miller, D. (1939). **Sheep Maggot-Fly Problem. New Zealand Survey, 1937-38.**—*N.Z. J. Sci. Tech.* **21.** 240A–244A. [Author's summary copied *verbatim*].

Maggots from struck sheep were received from various parts of the Dominion and flies reared therefrom. The results are analysed as far as the limited data allow from the points of view of (1) causes of strike, (2) species of flies concerned, and (3) the apparent zones in which the two primary flies (*Calliphora laemica* and *Lucilia sericata*) dominate.

Shterngol'd, E., & Getsonok, N. (1938). [**Influence of some Factors upon the Life-Cycle of** *Boophilus annulatus calcaratus* **Birula**].—*Acta Univ. Asiae med.* (*8, Zool.*). No. 47. pp. 12. [In Russian: English summary]. [Abst. from abst. in *Rev. appl. Ent.* **29.** 142].

Laboratory observations were carried out on the effects of temperature, light, and relative humidity on oviposition and hatching of the eggs of *B. calcaratus*, a vector of bovine piroplasmosis which is widely distributed in Central Asia. The results showed that optimum conditions occurred at 30°C. and about 100% R.H. At 18°C. oviposition was both delayed and prolonged, and the numbers of eggs laid and the percentage that hatched were reduced. At either temperature combined with low R.H., all the eggs dried up. The presence or absence of light had little effect.

Smith, D. J. W. (1941). **Studies in the Epidemiology of Q Fever. 7. The Biology of *Haemaphysalis humerosa* Warburton and Nuttall (Acarina, Ixodidae) in Queensland.**—*Aust. J. exp. Biol. med. Sci.* **19.** 73–75. [For previous parts, see *V. B.* **12.** 26].

The life cycle and distribution of this tick, which was previously reported as being a vector of "Q" fever, is now described fully for the first time.—W. I. B. Beveridge.

Sugimoto, M. (1940). **Studies on the Formosan Mites. On the Feather Mites, Analgesidae Canestr. 1892.**—*Bull. Sch. Agric. For., Taihoku Imp. Univ.* No. 1 pp. 40–58. [In Japanese: English summary]. [Abst. in *Rev. appl. Ent.* **29.** 73, copied *verbatim*].

A general account is given of the morphology, biology and taxonomy of Analgesid mites, together with descriptions and host records of the Formosan species. They include *Ptero-*

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lichus columbae, sp. n., on domestic pigeon and another new species on a wild bird.

RIET, J. (1941). Infección de gallinas por Hectopsylla Psittace. [*H. psittaci* **Infestation of Fowls**].—*An. Fac. Vet. Montevideo.* **3.** 505–508.

R. reports the occurrence of *H. psittaci* infestation of fowls in Montevideo. The parasites were found in great numbers on the head region where they were firmly attached and immobile. It was only when they were rubbed off that they jumped and could be recognized as fleas. Several birds died as a result of the infestation, but creolin proved an efficient insecticide in the hen houses.—M. WATSON.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

KULIKOV, N. S. (1938). **[Helminth Parasites of Horses (*Dictyocaulus*, *Probstmayria*, and *Anoplocephala*)].**—*Trav. Mus. zool., Kiev.* No. 21/22. pp. 171–176. [In Russian: German summary]. [Abst. in *Helminth Abstrs.* **7.** 219, copied *verbatim*. Signed: A. E. F.]

Kulikov found *Dictyocaulus arnfieldi* in 31·1% of horses examined in the Ukraine, *Probstmayria vivipara* in 27·1%, *Anoplocephala magna* in 7·5%, *A. perfoliata* in 34·1% and *Paranoplocephala mamillana* in 21·5%. Carbon tetrachloride and turpentine were found to be of use against *Probstmayria vivipara*.

JAMES, H. D. (1941). **A Type Survey of Parasitic Ova in the Feces of Military Horses.**—*Vet. Bull. U.S. Army.* **35.** 46–51.

Two faecal samples were obtained at a 21-day interval from each of 50 U.S. army horses in poor condition. A gross examination was first made by means of a sugar-flotation-centrifugation technique. Species differentiation was determined on the larvae which hatched after 72 hours' incubation. Parasitic ova were observed in 99% of the samples. Of these, a mixed *Parascaris equorum* and *Strongylus vulgaris* infection was found in 6%. These parasites occurred particularly in the younger animals, *P. equorum* being found in 10% and *S. vulgaris* in 32% of the horses examined. *S. edentatus* and *S. equinus* were found to infect older animals, with an incidence of 22% and 30% respectively.—M. L. BINGHAM.

WILLIAMS, T. H. (1940). *Echinococcus granulosus* **in Szechwan.**—*Chin. med. J.* **57.** 176–178. [In English].

A brief account of the finding of *E. granulosus* in the intestine of a dog, this being stated to be the first record of this worm in a dog in the Szechwan province of West China. Measurements of the nine specimens are given in a table.—J. E.

TETLEY, J. H. (1941). **The Epidemiology of Low-Plane Nematode Infection in Sheep in Manawatu District, New Zealand.**—*Cornell Vet.* **31.** 243–265.

A flock of 107 Romney-cross sheep consisting of 30 old ewes, 36 yearlings, and 41 lambs was maintained on a pasture in the Manawatu district. Six animals from each age group, selected at random, were killed at two-monthly intervals and differential worm counts made. The available pasture was reduced in accordance with the reduction of the flock. It was shown that the 20 species of nematodes present had a seasonal incidence with a tendency for species to appear in succession. Infection acquired by lambs soon after birth included the following:—*Strongyloides papillosus*, *Nematodirus* spp., *Ostertagia* spp., *Trichuris ovis*, and *Chabertia ovina*. With other worms (*Haemonchus contortus*, *Trichostrongylus* spp., and *Cooperia curticei*) the onset of the main infection was delayed until late summer, autumn, and winter. *Ostertagia*, *Haemonchus* and to a lesser extent *Nematodirus* were able to reinfect yearlings and also old sheep though the populations found in the latter were small. *C. curticei* and to a large extent *S. papillosus* were present continuously in all three age groups.

The annual appearance of a susceptible lamb population set the cycle of infection in motion. It was evident that *Nematodirus*, *Ostertagia*, and *Strongyloides* were available to the sheep in large numbers through the year whilst *Haemonchus* and *Trichostrongylus* were available principally in the autumn.

It is suggested that infection was rapidly gained, but the development of resistance limited the pitch of infection which declined rapidly following the peak. Under the conditions of the experiment, onset of resistance to *Nematodirus* and *Trichuris* took place too early for the sheep to be able to reinfect themselves materially by contaminating pastures. *Nematodirus* infection must have arisen from

pasture infection by lambs of the previous season, since this genus was largely confined to lambs. Infection with *Chabertia*, *Haemonchus*, and *Trichuris* must similarly have arisen from contamination of pasture prior to the birth of the lambs. With *Ostertagia* spp. and *Strongyloides*, on the other hand, no definite interval between seasons of infection occurred and it is assumed that appreciable infection of contemporary origin must have taken place. The data obtained illustrate the problem of age resistance. Worm populations in yearlings were greater than those in old sheep, and the peak of infection for *Ostertagia* occurred earlier in successive age groups.—H. E, H.

ENIGK, K. (1941). Die Verhütung von Rundwurminvasionen bei Schafen in Sudwestafrika. **[The Avoidance of Roundworm Infestation of Sheep in South-West Africa]**.—*Z. InfektKr. Haustiere.* **57.** 119–138.

Losses from roundworm infestation in sheep in south-west Africa average about 3–6% yearly. E. notes that most farmers rely on dosing as a means of control, but points out the importance of precautionary measures for the avoidance of infestation, to be practised in addition to dosing. These are particularly important in the case of infestations with *Oesophagostomum* spp. against which anthelmintics have only a slight effect.

The effect of different environmental conditions on the development of the infective larvae was studied. It was shown that in sheep dung lying on bare pasture in dry weather the larvae were killed before the infective stage was reached, with the exception of fully embryonated eggs of certain species of trichostrongyles which resisted desiccation. Covering with a thin layer of earth delayed drying and favoured the development of moderate numbers of larvae; thick plant growth and moist conditions also favoured development. Worm larvae in cattle dung were more favoured owing to the mass and moisture-retaining properties of this type of faeces. Sandy soils favoured development more than loams. Important sources of infection were the sheep tracks on pasture and the environs of native huts. The principal sources of infection with hookworms and *Strongyloides* were the moist low-lying pastures, the environs of kraals, and wet places around watering troughs. Such places could be avoided and the sheep tracks could be changed frequently. On sandy soils large areas of dry high-lying land were often heavily infected with trichostrongyles and *Oesophagostomum*. It was not possible to avoid these altogether but change of pasture provided a good means of control. As a result of experiments on the survival of these parasites on pastures, E. recommends as a minimum three changes of pasture, one at the beginning of the rainy season, one 12 weeks later, and a third at the end of the rains. The sheep would spend about six months during the dry season on a single pasture which would, of course, be more extensive than the pastures used for the two changes of wet-season grazing. Low-lying pasture could only be used in the dry season. A fourth change of pasture during the dry season was an advantage where practicable. While pastures were being rested no other ruminants should be allowed to graze on them.

In the kraal itself, the larger the kraal the greater was the danger. In the smaller kraals the first- and second-stage larvae were largely killed by ammonia and other manurial products. On some farms it was the practice to fence off a pasture near the vegetable garden and by daily watering to provide extra feed for the dry season. The sheep were allowed to graze here for an hour or so daily. Such "grass-gardens" were very dangerous, especially for the development of *Strongyloides*. E. believed that infestation could be avoided by cutting the grass and feeding to the sheep outside.

—H. E. HARBOUR.

KOBRO, M., & OWREN, P. (1941). Trikinose-epidemien på Nedre Romerike (Asershus). **[Trichinosis Outbreak in a Suburb of Oslo]**.—*Nord. Med.* **9.** 447–451. [German summary]. [Abst. from abst. in *Bull. Hyg., Lond.* **16.** 342].

According to the authors, trichinosis has not occurred in Norway for nearly 60 years. In the summer of 1940, seven definite cases were observed in a suburb of Oslo. The source proved to be Norwegian pork improperly prepared.

BEESON, P. B. (1941). **Factors Influencing the Prevalence of Trichinosis in Man.**—*Proc. R. Soc. Med.* **34.** 585–589. Discussion pp. 589–594.

The incidence of swine trichinosis in Britain is much lower than it is in the U.S.A., where up to 5% of swine may be infected in parts

where garbage feeding is practised. Trichinosis is very rare in British swine, and since all swill must be boiled before feeding, it is unlikely that the disease is transmitted continuously among swine. It is, however, endemic amongst rats, from eating which an occasional case of swine trichinosis may result. The recent increase in the prevalence of human trichinosis may be due to the making of sausages from meat from old sows, which have had more opportunities to pick up an infection.

In the discussion which followed R. T. LEIPER stated that no trichinae had yet been found in an examination of over 4,000 pig carcasses. About 25% of rats caught in South London were infected; at the sewage works at Wolverhampton two out of 13 were infected, whilst nine out of 116 rats caught on the refuse dump at Penrith showed the parasites. No infected rats were found on farms around the last two places and the actual sources of infection were not found. One cat was found to be infected on a smallholding near Penrith, where none of the remaining pigs showed trichinae and no rats were obtainable.

ROGERS reported the results of preliminary experiments on the metabolism of rats fed with *T. spiralis*. CLAPHAM showed that the host species is an important factor in determining the time at which invasion of the muscles occurs. J. W. G. LEIPER reported that two artificially infected pigs developed a maximum eosinophilia of 30% on the 19th day in one case and of 31% on the 17th day in the other after being fed with encysted larvae. The eosinophile count was normal in the first pig after the 26th day, and in the second pig on the 29th day. YOUNG examined the diaphragms of 4,086 pigs and found all to be uninfected. Of 47 human diaphragms obtained from Wolverhampton and elsewhere, six were infected. All the positive cases were found in the Midlands, and none had been detected during life.—M. L. BINGHAM.

BEAHM, E. H., & JORGENSEN, M. N. (1941). **Some Effects of Experimental Trichinosis in the Dog.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 294–299.

The blood picture was followed in ten parasite-free adult dogs for periods of 13–22 days before, and 60 days after, infection with doses of 90,000–480,000 trichina larvae in fresh rabbit muscle. Cell volume, total erythrocyte count, and haemoglobin remained essentially unaltered. All animals showed eosinophilia reaching a maximum (11–38%) 10–15 days after infection. No significant changes were observed in counts of other leucocytes. Significant changes in serum-calcium level were noted in only four dogs, which had received 32,000–66,000 larvae per kg. body weight and showed symptoms of severe trichinosis. Three other dogs which had received 34,000–55,000 larvae per kg. showed marked eosinophilia but no rise in serum calcium.—E. S.

LEVIN, A. J. (1941). **Recovery of *Trichinella spiralis* Larvae in Early Stages of Infection.**—*J. Parasit.* **27.** 107–113.

L. describes a method for the recovery of *Trichinella* larvae in infections of from 6–21 days, by maceration of the host tissue and without the use of digestive agents such as pepsin, which would destroy these young worms. Using this method he finds that, in rats, the larvae are not recoverable from the muscles until six days after infection, and that the number obtainable increases greatly from the sixth to the 12th day, after which it remains constant.

The larvae when recovered on the sixth day after infection are still the same size as those squeezed from a gravid female. No adult worms were found in the rats' intestines after 16 days of infection.—K. M. SANDERSON.

BUGGE, G. (1941). Ueber Muskel- und Herztrichinen. [**Muscle and Heart Trichinae**].—*Tierärztl. Rdsch.* **47.** 175–179.

A longer, illustrated account of a paper which has already been abstracted [see *V. B.* **11.** 872].

MARKOV, G. (1939). [**Some Factors Influencing the Distribution of *Syngamus trachea* in Starlings**].—*Trav. Inst. biol. Peterhof.* **17.** 89–95. [In Russian: English summary]. [Abst. from abst. in *Helminth. Abstrs.* **8.** 196].

M. found that 28% of starlings in the district of Leningrad were infected with gapeworms. He concludes that wild birds may be dangerous as disseminators of the parasite. The danger is somewhat offset by the fact that birds show a varying degree of age immunity which restricts the growth and maturation of the parasite.

CORT, W. W., & OTTO, G. F. (1940). **Immunity in Hookworm Disease.**—*Rev*

Gastroenterol. **7.** 2–11. [Abst. from abst. in *Trop. Dis. Bull.* **38.** 476].

It is difficult to explain many results of experimental *Ancylostoma caninum* infections in dogs otherwise than by development of specific immunity resulting from repeated infections; this immunity may be highly protective, but there is no evidence that it becomes absolute, and it is complicated by the factors of age, diet, and anaemia. Mature dogs are believed to be able to acquire a specific immunity more quickly than young animals. In dogs seriously debilitated by defective diet or anaemia the mechanism that produces and maintains specific immunity cannot respond effectively to invading worms. This immunity is general and not local, is caused by specific antibodies, and the continuous presence of worms in the intestine or tissues is needed to maintain it.

KATES, K. C. (1941). **Observations on the Viability of Eggs of Lungworms of Swine.**—*J. Parasit.* **27.** 265–272.

K. has carried out experiments designed to ascertain the survival time of eggs of *Metastrongylus elongatus* and *Choerostrongylus pudendotectus* on and in soil, and the effects of low and high temperatures and of drying.

The measure of viability of eggs submitted to the different tests was ability to infect susceptible earthworms (*Helodrilus* sp.). Eggs in faeces on the surface of outdoor plots, whether free of vegetation or planted with barley, died in 32 days or less. Some eggs in faeces buried 4–12 in. deep in these plots survived 381 days, but the majority died in about 290 days; the death rate was noticeably lower in the seeded than in the unseeded plots. Eggs in moist faeces could survive continuous freezing at −8° to −20°C. or lower as long as 108 days. Small numbers of eggs in moist faeces survived exposure for 10 min. or less to temperatures of 40° and 50°C. but none survived 55°C. or higher. A small proportion of eggs in dried faeces was able to survive 38 days continuous desiccation at 1°–2°C.; none survived 25 days or longer at 17°–22°C. or higher and the majority was killed after only seven days.

These results, K. points out, serve to explain in part the recorded occurrence of lungworm-infected earthworms in areas unused by pigs for as long as four years. Since lungworm eggs are most susceptible to desiccation and high temperatures, raising pigs on well-drained temporary pastures tends to be the most effective control measure. Allowing soil contaminated with lungworm eggs to lie fallow, after the removal of infected animals, for at least a month during summer and before ploughing is undertaken, should also materially aid in controlling the parasites.—J. N. OLDHAM.

CALZADA, V. (1941). Contribución al estudio de la evolución de Metastrongylidae. Demonstración micrográfica del trayecto pulmonar de la evolución de Metastrongylus y Dictyocaulus. [**Photomicrograph Demonstration of the Development of *Metastrongylus* and *Dictyocaulus* in the Lungs**].—*An. Fac. Vet., Montevideo.* **3.** 515–522.

This paper is accompanied by a number of photomicrographs which confirm the accepted views on the development of *Metastrongylus* and *Dictyocaulus* larvae in the lungs of swine and sheep.—MILLER WATSON.

*REFUERZO, P. G. (1940). **Arthropod Intermediate Hosts of *Acuaria hamulosa* in the Philippines. I.**—*Nat. appl. sci. Bull., Univ. Philipp.* **7.** 407–414. [Abst. in *Exp. Sta. Rec.* **84.** 533, copied *verbatim*].

Search was made for intermediate hosts of the gizzard worm *A. hamulosa*, a parasite of poultry in various parts of the world which was found to infect as high as 20 percent. of the chickens examined. Two grasshoppers, *Aeolopus tamulus* (F.) and *Oxya sinensis* Walk., were discovered to act as such, *A. tamulus* for the first time and *O. sinensis* previously recorded from Hawaii. Larvae from 18 to 20 days old parasitized birds that were fed infected grasshoppers. Eggs were recovered from the droppings in from 85 to 96 days.

DISEASES, GENERAL

LENTZ, R. W. (1939). Arbeiten über Schweinekrankheiten im Jahre 1938. [**Work on Swine Diseases in 1938**].—*Berl. Münch. tierärztl. Wschr.* Dec. 22nd. 737–742.

This is a discussion compiled from 101 German and foreign articles appearing in 1938 on swine fever, porcine encephalomyelitis, piglet influenza, swineherds' disease, foot and

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mouth disease, TB., swine erysipelas, pasteurellosis, paratyphoid, anthrax, actinomycosis, skin diseases, sudden death (the so-called *plötzliche Herztod*), trichinosis, nutritional diseases, and various organic and functional disorders.—J. E.

PIENING, C. (1941). Neues auf dem Gebiete der Schafkrankheiten. [**Recent Advances in Sheep Diseases**].—*Berl. Münch. tierärztl. Wschr.* June 6th. 273–277.

This is a brief survey of the well recognized disease conditions of sheep and includes an excellent bibliography from which P.'s information is drawn. No new information is given. —N. S. BARRON.

REMMERS, H. (1939). Erblich bedingte Vordergliedmassenverkrümmung des Rindes in einer Schwarzbuntzucht Nordwestdeutschlands. [**Hereditary Curvature of the Fore Limbs in Cattle of the Black Pied Breed of North-West Germany**].—*Inaug. Diss., Hanover.* pp. 32. [Abst. in *Anim. Breed. Abstrs.* **8.** 124, copied *verbatim*].

In one herd there were observed 15 calves exhibiting a marked bending of the carpal joint. All were sired by a premium bull "A". The bull, his parents, and all the dams of the affected calves showed no defect. The anomaly was so severe that all the calves had to be slaughtered, with the exception of a ♂ "E", which had only a mild degree of the defect. Gradually this disappeared and the bull was later licensed and passed for stud work. He was mated with a half-sister and sired a highly deformed ♂ calf which had to be slaughtered when 14 days old, there being no hope of the defect "growing out". The author believes that the defect is due to a sublethal gene.

YORK, W. K. (1941). **A Herd Condition of Swine Characterized by Persistent Sneezing and Nasal Hemorrhage.**—*Fort Dodge bio-chem. Rev.* **12.** No. 2. 18.

A group of 80 twelve-week-old Poland China pigs in Indiana started to sneeze in an alarming fashion. The animals obtained relief only after passing large clots of blood from the nose. This procedure was repeated constantly throughout the fattening period, although inappetence or other symptoms of disease were never manifested. Some 60 of the animals attained weights in the region of 300 lb. at nine months, while the remainder grew very badly and at 12 months had an average weight of only 130 lb. P.M. examination of one of the stunted pigs revealed a thickened but non-ulcerated nasal septum. Cessation of growth of the upper jaw, with subsequent hypognathy and wrinkling of the facial skin, was a constant feature throughout the group.

The condition has recurred in litters subsequently born on the same farm. The cause is unknown, but a similar outbreak is said to have occurred elsewhere in Indiana in about 1934.

[This disease seems to be the same as *Schnüffelkrankheit*, a deforming rhinitis (see *V. B.* **11.** 465 and 707.)]—A. N. WORDEN.

I. HEASLIP, W. G. (1940). **An Investigation of the Condition Known as Coastal Fever in North Queensland : Its Separation from Scrub-Typhus.**—*Med. J. Aust.* Nov. 30th. 555–564.

II. GUNTHER, E. M. (1940). **A Survey of Endemic Typhus in New Guinea.**—*Ibid.* 564–573.

I. During recent years investigations have been carried out on the various human fevers in Queensland. H. found that typhus accounted for only a small proportion of the cases. When cases of typhus, "Q" fever, and leptospirosis were separated out there still remained a coastal fever which was apparently a single disease entity. H. constantly found in these cases a rod-shaped organism which was pleomorphic and usually appeared as a bipolar, Gram-negative bacillus. This organism was also found in typhus patients and in 70% of captured rats and bandicoots.

II. In New Guinea, endemic typhus is probably transmitted by larval trombidiid mites and the effective reservoir is probably a bandicoot.—W. I. B. BEVERIDGE.

BICK, M., & WOOD, I. J. (1941). **The Biochemical Changes in Paralytic Ileus and Intestinal Obstruction.**—*Med. J. Aust.* Feb. 1st. 140–145.

A detailed investigation was made of the biochemical changes which occurred during paralytic ileus and intestinal obstruction in six human cases. A deficiency of sodium chloride associated with a diminution of chloride in the urine, a depletion of plasma protein content, and some degree of acidosis occurred as a result of extensive loss of fluid, food and salts

by vomiting and by aspiration. The concentration of urea in the blood was somewhat above normal.—W. I. B. Beveridge.

László, F. (1941). Teleangiectasia maculosa pararenis. [**Telangiectasia maculosa of the Adrenal Gland**].—*Dtsch. tierärztl. Wschr.* **49.** 411–412.

The otherwise normal adrenal glands of a horse had a bluish-black speckled appearance due to the presence of large numbers of focal collections of capillaries in the cortex. This condition has been previously recorded in the horse and ox and may be due to replacement by newly formed capillaries of areas of adrenal cortex which have undergone fatty degenerative changes.—E. G. White.

I. László, F. (1941). Medulläre Geschwülste der Nebennieren. [**Tumours of the Adrenal Medulla**].—*Dtsch. tierärztl. Wschr.* **49.** 362–364.

II. László, F. (1941). Primäre Geschwülste der Nebenniere. [**Primary Tumours of the Adrenal Glands**].—*Ibid.* 379–380.

III. László, F. (1941). Metastatische Geschwülste in der Nebenniere. [**Metastatic Tumours of the Adrenal Glands**].—*Ibid.* 403–404.

I. This short article consists mainly of a review of tumours of the adrenal medulla in man and animals. It includes a brief description of five new cases, four in cattle and one in a horse. All the tumours are classed as "telangiectatic phaeochromoblastoma": their histological structure bore some resemblance to a haemangiosarcoma but the tumours were benign.

II. Together with a brief review of the literature, L. describes three adrenal tumours in animals, *viz*, cortical adenoma (horse), fibrosarcoma of the cortex or medulla (ox), carcinofibrosarcoma of the inner cortex or medulla (pig).

III. A brief description of multiple secondary round-cell sarcomas involving one adrenal in a pig (primary site not stated) and a secondary melanotic sarcoma in the left adrenal of a horse with widespread melanosarcomatosis.

—E. G. White.

Mosconi, R. D. (1941). Disembriomas neoplásticos del riñón en los animales. [**Kidney Tumours in Animals**].—*Rev. Med. vet., B. Aires.* **23.** 97–122.

A classification of renal tumours with histological descriptions of four embryonic tumours, three from pigs and one from a bovine.—M. W.

Matthias, D. (1941). Seminom bei einem Pferde. [**A Seminoma in a Horse**].—*Berl. Münch. tierärztl. Wschr.* May 16th. 242–248.

A description of a seminoma, about the size of a child's head, in the left testicle of an 18-year-old stallion. There were secondary implantation metastases on the tunica covering the right testicle and secondary tumour masses in the left spermatic cord, as well as numerous implanted masses throughout the peritoneal cavity.

A brief review of the literature suggests that many testicular tumours in animals described under various names were in fact probably seminomas and that the latter term should be employed in future for all neoplasms of the testis having the well recognized histological characters of seminomas.—E. G. White.

Hoch-Ligeti, C. (1941). **Studies on the Effect of Carcinogenic Hydrocarbons on Immunity Reactions.**—*Brit. J. exp. Path.* **22.** 233–240. [Author's summary copied *verbatim*].

Prolonged treatment with carcinogenic hydrocarbons previous to immunization did not influence the ability of rabbits to produce precipitating antibodies.

In immune rabbits the injection of a carcinogenic hydrocarbon provokes a sudden drop in the amount of the immune bodies within 48 hours.

Furth, J., & Kabat, E. A. (1941). **Immunological Specificity of Material Sedimentable at High Speed Present in Normal and Tumour Tissues.**—*J. exp. Med.* **74.** 247–256. [Authors' summary copied *verbatim*].

Materials sedimentable at high speed (approximately 27,000 R.P.M.) were found in all normal and neoplastic tissues studied. They are carriers of the Forssman antigen and of the Wassermann hapten.

These heavy materials exhibit species, organ, and individual specificity and produce several antibodies which can be demonstrated by absorption tests.

Heavy materials from chicken sarcoma and chicken spleen could not be distinguished by complement fixation tests.

NUTRITIONAL AND METABOLIC DISORDERS

Ben Dor, B.-A. (1941). **Requirement of Potassium by the Chick.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 341–343.

It is demonstrated that more than 0·13% of potassium was necessary to prevent heavy mortality of chicks reared on an otherwise adequate diet; at least 0·17% K was necessary to promote approximate maximal growth. The ability of rubidium to replace K in the same basal diet was tested, but Rb was found to have only a slight and temporary alleviating effect on the K deficiency.—R. Allcroft.

Stewart, J., Mitchell, R. L., & Stewart, A. B. (1941). **Pining in Sheep: Its Control by Administration of Cobalt and by Use of Cobalt-Rich Fertilizers.**—*Emp. J. exp. Agric.* **9.** 145–152.

Pining in sheep on a Ross-shire farm, where the soil contained less than 2 p.p.m. Co, was controlled by the oral administration of 10 mg. Co (as the chloride) per head per week. Following similar work in Australasia attempts were made to improve the Co status of the soil and pasture by manuring with superphosphate containing $CoCl_2$, and subsequent analysis showed that the increase in Co content was related to the level of the Co manuring. In a further experiment in the same area, a pasture was divided into two; one half was manured with $CoCl_2.6H_2O$ at the rate of 2 lb. per acre. Lambs were allowed to graze the pastures and although pining occurred amongst those animals on the untreated pasture, no cases developed amongst those lambs on the Co-treated pasture, the latter animals being on the average nearly 5 lb. per head heavier than the controls.

—Alfred Eden.

Ellis, N. R., & Madsen, L. L. (1941). **Relation of Diet of Swine to Development of Locomotor Incoordination Resulting from Nerve Degeneration.**—*J. agric. Res.* **62.** 303–316.

An attempt was made to elucidate the aetiology of the "troublesome locomotor disorder" previously described by E. and co-workers [*V. B.* **8.** 241]. The incidence of lameness in the Bureau of Animal Industry herd at Beltsville, Md., was high among pigs receiving stock diets of yellow corn, tankage containing 60% protein, linseed meal, alfalfa meal and a mineral mixture, but was greatly increased by heating such diets to dryness at a temperature of 115°–120°C. for 30–40 hours. While no natural foodstuffs conferred complete protection when given as a supplement, the administration of liver, concentrated milk products, oats, or barley appeared to lower the incidence of the condition. Severe symptoms occurred in animals not provided with a mineral supplement. Myelin degeneration of the spinal cord and peripheral nerves was found in all cases of the disease.—A. N. Worden.

Wilgus, H. S., Jr., & Gassner, F. X. (1941). **Effect of Soybean Oil Meal on Avian Reproduction.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 290–293.

The goitrogenic effect of soya-bean-oil meal has been demonstrated [*V. B.* **12.** 121.], but it was found that production and reproduction were very poor on a ration consisting essentially of ground yellow corn, dried brewers' yeast residues, soya-bean-oil meal, steamed bone meal, salt, and vitamin D, even when sufficient iodine was present to prevent goitre. When soya-bean-oil meal was replaced with casein and oat groats, the reproductive performance improved, but when meat scrap was given as the chief protein supplement much better results were obtained. The viability and condition of chicks hatched from eggs of hens on the experimental ration containing no meat scrap were very poor. These results indicate that either soya-bean-oil meal exerts a depressing effect on reproduction or that meat scrap, bran, shorts, and possibly casein tend to correct a deficiency in the ration. It is pointed out that this goitrogenic type of ration with casein will support an excellent rate of growth, but fails to maintain satisfactory production, egg size, fertility, and hatchability. It is suggested that there may be a relationship between the goitrogenicity of soya-bean-oil meal and the poor reproduction observed in these experiments.—R. Allcroft.

Black, S., McKibbin, J. M., & Elvehjem, C. A. (1941). **Use of Sulfaguanidine in Nutrition Experiments.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 308–310.

The variable results obtained in studies on the newer members of the vitamin B complex suggested that intestinal bacteria may synthesize certain unidentified factors essential in the nutrition of the rat. Administration of sulphaguanidine, an antibacterial agent which is

poorly absorbed from the intestine, was used to investigate this question. On a purified basal ration, addition of 0·5% sulphaguanidine greatly reduced the growth rate of young rats, but optimum growth was obtained when liver extract was fed with the sulphaguanidine. It has been shown that *p*-aminobenzoic acid inhibits the action of sulphanilamide [see *V. B.* **11.** 128.] and in the present experiments when *p*-aminobenzoic acid was fed with sulphaguanidine from the beginning of the experimental period, the growth rate was increased, but no response was obtained during the first week when it was fed to rats which had received sulphaguanidine alone for several weeks. These results indicate that *p*-aminobenzoic acid reduces the toxic effect of sulphaguanidine on certain bacteria in the intestine, but when the bacteria are eliminated from the tract by the sulphaguanidine before *p*-aminobenzoic acid is administered it takes at least a week for the bacteria to become re-established. Vitamin K has been shown to be synthesized in the rat's intestine [see BRINKHOUS—*V. B.* **12.** 169.], but no rats had a blood clotting time longer than 2 min. even after seven weeks on sulphaguanidine.—R. ALLCROFT.

SWANK, R. L., & BESSEY, O. A. (1941). III. **Avian Thiamine Deficiency. Characteristic Symptoms and their Pathogenesis.** —*J. Nutrit.* **22.** 77–89. [For part I, see *V. B.* **11.** 54. Part II untraced].

Studies on the effect of thiamin and food intake upon the symptomatology of thiamin-deficient pigeons are recorded. Pigeons fed *ad lib.* a mixed grain diet which had been autoclaved for six hours at 20 lb. pressure exhibited very variable effects. Pigeons fed by tube with a thiamin-free mash in quantities sufficient to prevent large weight loss invariably developed an acute thiamin deficiency characterized by opisthotonus. The feeding of smaller quantities tended to make the deficiency state appear more chronic. When the diet was made only partially adequate by small additions of thiamin, ataxia and leg weakness developed in all pigeons and cardiac failure in many.

Opisthotonus and mild cardiac failure were promptly relieved by intramuscular injections of thiamin, but leg weakness was restored to normal slowly.

The thiamin requirement varied with the food intake, 1·25 mg. per g. of the diet used being required to prevent the development of symptoms in pigeons.—F. D. ASPLIN.

KRINGSTAD, H., & LUNDE, G. (1940). Vitamin B-kompleksets betydning for sölvrev. **[The Importance of the Vitamin B Complex for the Silver Fox].**—*Skand. VetTidskr.* **30.** 1121–1143. [English and German summaries].

An account, illustrated by photographs, is given of the effects of feeding seven young silver foxes on a diet deficient in the B vitamins. Ordinary B_1 deficiency was easily produced and cured by thiamin. Deficiency of the rat-growth factor B_w caused decrease in weight, cessation of growth, and finally death unless substances which contained this factor were administered. Also for normal development of the fur it was shown that the anti-grey-hair factor or B_x is necessary for the silver fox [see also *V. B.* **11.** 253]. It is concluded that a diet sufficient in all the B vitamins is of great importance in silver fox breeding.

MACKAY, E. M., & BARNES, R. H. (1941). **Cure of Signs of Egg White Disease by Corn Oil Fatty Acids and Vitamin B_6.** —*Proc. Soc. exp. Biol., N.Y.* **46.** 353–357.

The acrodynia which occurs in rats when commercial dried egg white is included in the diet in fairly large amounts, developed much more slowly when 10% of the fat in the diet consisted of corn [maize] oil which is rich in linoleic acid. When vitamin B_6 was given in addition to corn oil almost all the signs of the acrodynia disappeared. These results are in agreement with those of SCHNEIDER *et al.* [*V. B.* **11.** 254].—R. ALLCROFT.

EMERSON, G. A. (1941). **Failure to Cure or Prevent Graying of Rats with p-Amino-Benzoic Acid.**—*Proc. Soc. exp. Biol., N. Y.* **47.** 448–449.

ANSBACHER [*V. B.* **11.** 551.] reported that *p*-aminobenzoic acid would cure the achromotrichia of rats. Results are now reported which show that addition of 3 mg. daily of *p*-aminobenzoic acid failed to cure the greying of the fur of rats maintained on a vitamin B deficient diet supplemented with thiamin, riboflavin, and pyridoxin. The fur of animals on a similar diet but supplemented with 100 μg. daily of pantothenic acid and of another group on a diet supplemented with both 100 μg. of pantothenic acid and 3 mg. of *p*-aminobenzoic acid, became markedly darker after 25–30 days.

Another group of rats maintained on the exact Ansbacher diet failed to develop any greyness after more than two months. In E.'s experience animals deficient in pantothenic acid invariably showed marked greying before the end of this period.—R. ALLCROFT.

ALMQUIST, H. J., MECCHI, E., & KRATZER, F. H. (1941). **Effect of Milk on Gizzard Erosion and Cholic Acid in the Chick.** —*Proc. Soc. exp. Biol., N.Y.* **47.** 525–526.

Addition of liquid milk products to a diet producing gizzard erosion distinctly reduced the severity of the disorder, increased the gall-bladder bile volume, and the quantity of cholic acid per chick. Whole dried milk, dried skim milk, dried buttermilk, and dried whey did not have this effect. Heating to boiling point or distillation by steam did not remove the activity of the liquid milk. These results indicate that cow's milk contains a substance with an activity similar to that of cholic acid [see also *V. B.* **12.** 112].—R. ALLCROFT.

JUKES, T. H. (1941). **The Effect of Certain Organic Compounds and Other Dietary Supplements on Perosis.**—*J. Nutrit.* **22.** 315–326.

J. records further studies on the nutritional conditions which affect the development of perosis [see also *V. B.* **11.** 53 and 626]. Choline deficiency in chicks is characterized by slow growth and perosis. A diet is described for the production of acute choline deficiency. If creatine or gelatin was omitted from the diet perosis did not develop but casein seemed to stimulate the onset of the disorder. Both manganese and choline were found to be necessary for normal growth and the prevention of perosis. Methionine protects rats from choline deficiency, but it was without effect when fed at a level of 0·5% to chicks.—F. D. A.

BRINKHOUS, K. M. (1940). **Plasma Prothrombin ; Vitamin K.**—*Medicine.* **19.** 329–416.

In this comprehensive review, the more recent developments relating to prothrombin and vitamin K are discussed. The physiological considerations of prothrombin, such as its role in blood clotting, and the nature of the reaction concerning the conversion of prothrombin to thrombin, are dealt with ; methods for the quantitative determination of prothrombin are described. The next part of the review deals with vitamin K and its relationship to prothrombin formation. Much of the knowledge of this vitamin resulted from a study of the deficiency in chicks which caused haemorrhagic chick disease. Methods of assay, the chemistry, and the natural occurrence of the vitamin are discussed. The last section is devoted to the part played by plasma prothrombin and vitamin K in disease. Although a simple dietary deficiency of the vitamin produces haemorrhagic disease and a prolonged blood-clotting time in chicks, ducklings, and goslings, and causes the same symptoms in a much milder degree in pigeons and canaries, many attempts to produce a haemorrhagic disease in mammals by feeding a diet deficient in vitamin K have failed. The reason for this appears to be the absorption of sufficient of the vitamin, synthesized in the intestine by bacteria, to prevent the development of a deficiency.

In certain types of liver disease and following experimental liver injury or hepatectomy, a decrease in plasma prothrombin occurs ; the haemorrhagic tendency associated with both obstructive jaundice and biliary fistula is also due to a lowered plasma prothrombin level. This in turn is the result of a deficiency in vitamin K, which is absorbed inadequately from the intestine in the absence of bile. The beneficial effects of vitamin K therapy in these disorders are described. The recognition of the role of vitamin K in prothrombin production indicated the possible relationship between this vitamin and the hypoprothrombinaemia which occurs in haemorrhagic disease of the newborn infant.

Haemorrhagic sweet clover disease is also discussed ; although the prothrombin deficiency in this disease appears to be well established, the mechanism by which toxic sweet clover depresses the prothrombin level is not yet understood. Varying degrees of liver damage have been observed but whether the damage is sufficient to cause the hypoprothrombinaemia in this disease has not been determined. From the data available it appears that this disorder is a toxic disease unrelated to vitamin K deficiency, but there are no data indicating definitely the manner in which the intoxication affects the plasma prothrombin level. Other diseases and conditions, mainly human, in which haemorrhages occur, are briefly discussed.—R. ALLCROFT.

PHYSIOLOGY

ALLCROFT, W. M. (1941). **Observations on the Haemoglobin Level of Cows and Sheep.**—*J. agric. Sci.* **31.** 320–325.

Clinically normal cows and ewes in England and Wales showed a mean blood Hb level of 11·5 g.%, common range 9·5–13·5 g.% and extreme range 8–17 g.%, with no significant changes associated with age. No specific effect upon the Hb levels was encountered in " milk fever " and " grass tetany " of cows, and pregnancy toxaemia in ewes, but in chronic hypoglycaemic ketosis of the dairy cow a progressive anaemia was observed with some values falling to as low as 6 g.%. Still lower levels, down to 3·2 g.%, were found in the progressive anaemia associated with Northumbrian (border) " pining " of sheep.—A. EDEN.

UNDERWOOD, E. J. (1940). **Chemical Composition of the Bones of Sheep in Western Australia.**—*Aust. J. exp. Biol. med. Sci.* **18.** 405–408.

The weights and chemical composition are given of the femur and humerus from 11 four-tooth merino ewes after 5–6 months' grazing on poor quality, dry summer herbage in Western Australia, and four weaner merino wethers after 6–7 months on similar poor grazing. The chemical composition of specimens of the ribs and vertebrae from the wethers was also determined. The herbage in these areas may contain 0·18–0·26% P on the dry matter during the growing period, but during the dry period the level falls to about 0·12% in the early summer, and to about 0·07% by March and April.

No difference either in the fresh weight or in the composition of the bones was found between eight of the ewes receiving the poor grazing only, and three receiving the same grazing plus a supplement of 0·5–2·5 g. P daily for 3–4 months before death.—M. C. FRANKLIN.

NANDA, P. N., & SINGH, G. (1941). **A Study of the Factors Governing the Passage of Fluids through the Stomach of Sheep, Part I.**—*Indian J. vet. Sci.* **11.** 16–27.

The authors confirmed that copper sulphate solution stimulates reflex closure of the oesophageal groove so that fluid passes *in toto* into the abomasum when given after a 15–18 hours' fast. Copper sulphate solution, given to unstarved animals, did not stimulate the reflex, most of the dose remaining in the rumen. 4 oz. of water given after a fast of 38–42 hours was found to pass as a whole into the abomasum. The equilibrium of food and water in the rumen is a controlling factor in influencing the passage of fluid to the abomasum.

The authors state that it is unnecessary to fast sheep after routine dosing for gastro-intestinal worms and that they may be watered after being allowed to graze freely for some time.—P. R. KRISHNA IYER.

BELL, T. D., CASIDA, L. E., BOKSTEDT, T., & DARLOW, A. E. (1941). **Production of Heat and Ovulation in the Anestrous Ewe.**—*J. agric. Res.* **62.** 619–615.

Injections of pregnant-mare serum, sheep anterior pituitary extract, and progynon-B (benzoic acid ester of dihydrofollicular hormone) singly or in combination were given to 30 ewes, averaging 85 lb. in weight, during the anoestrous period. Ovulation without heat was produced regularly by the use of either pregnant-mare serum (single injection of 100 rat units), or sheep anterior pituitary extract. The number of ovulations per ewe was normal in the ewes given pregnant-mare serum, but ranged from 2–13 in ewes given sheep anterior pituitary extract. Progynon-B in doses of 1,000 and 2,000 rat units produced heat in five out of eight treated ewes. Combinations of pregnant-mare serum and progynon-B were generally unsuccessful in producing both heat and ovulation simultaneously.

Vaginal smears indicated no difference between the smears of ewes in which ovulation was induced without heat and the smears of ewes in which oestrus was induced without ovulation.—N. J. SCORGIE.

RAUTMANN. (1941). Trächtigkeitshormonnachweis im Stutenharn durch Lumineszenzanalyse. [**Luminescence Analysis for Pregnancy Hormone in Mare's Urine**].—*Z. InfektKr. Haustiere.* **57.** 148–158.

A summary is given of the methods available for pregnancy diagnosis in the mare. They are, firstly, clinical examination and secondly, examination of the blood or urine for the hormones of pregnancy by biological or chemical methods. The advantages and disadvantages of these several methods are discussed and a new and rapid method is proposed

based on fluorescence effects of pregnancy urine in ultra-violet light.

The procedure recommended is as follows :– 3 ml. of clean urine are mixed with 1 ml. of concentrated sulphuric acid and 11 ml. of water added. The mixture is well agitated and examined immediately in ultra-violet light. A green fluorescence denotes the presence of pregnancy hormones, whereas a blue fluorescence appears in their absence. Similar effects are observed with urine treated after the procedure of Cuboni, and in some cases with untreated urine. In cases where the new method gives a doubtful result it is recommended that the urine also be examined by Cuboni's method.

The new method is not applicable to blood serum. The serum of non-pregnant animals gives a positive reaction.—A. L. WALPOLE.

ANDRIEVSKIĬ, V. Y. (1939). **[The Effect of Disease of Scrotum on Sperm Production of Rams].** — *Dokl. Akad. sel'skohoz. Nauk.* No. 13. pp. 45–48. [In Russian]. [Abst. in *Anim. Breed. Abstrs.* **8.** 385, copied *verbatim*].

Observations were made on the effect of application of collodion on the scrotum, which, without producing mechanical injury, causes a disturbance of normal function of the skin and induces inflammation. Two series of experiments were carried out, one in winter, the other in spring, the duration of application being 18 and 10 days, respectively. Collodion produces a marked deterioration of the quality of sperm and atrophic processes in the testes. When it was applied for 10–18 days, the process was reversible and normality could be restored in 54–75 days. The necessity of keeping the genital organs of stud rams as clean as possible is stressed.

ANDRIEVSKIĬ, V. Y., BAĬDUGANOVA, E. P., & DOROSTISENKO, N. Y. (1939). **[The Effect of Vitamins on Defective Sperm of Rams].**—*Dokl. Akad. sel'skohoz. Nauk.* No. 23/24. pp. 45–48. [In Russian]. [Abst. in *Anim. Breed. Abstrs.* **8.** 835, copied *verbatim*].

Observations were made on 16 rams which had consistently yielded defective sperm. Of these 8 had testes which showed clinical changes whereas in the other 8 the testes were clinically normal. The rams received supplementary rations of substances rich in vitamin B, *e.g.* cod liver oil, wheat germ, yeast, and green lucerne. Only 4 rams showed an improvement in the quality of sperm, indicating that the production of defective sperm is due to degenerative changes in the testes and cannot be remedied by diet alone.

DRAGSTEDT, C. A., & ROCHA E SILVA, M. (1941). **Effect of Trypsin upon Blood Histamine of Rabbits.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 420–422.

It has been shown that the intravenous injection of trypsin into dogs leads to the liberation of histamine into the blood such as occurs in anaphylactic shock, but that the injection of antigen into sensitized rabbits leads to a reduction in the total blood histamine. This apparently paradoxical behaviour of the rabbit was investigated further to compare the effects of trypsin with those of antigen. 3–7 mg. per kg. of crystalline trypsin were injected into the marginal ear veins of five rabbits and the histamine content of the blood was estimated before and after the injection ; leucocyte counts were also made. There was a marked reduction in the total histamine in every case, associated with a reduction in the leucocyte count. *In vitro* experiments demonstrated that addition of trypsin to heparinized rabbits' blood resulted in no change in the total blood histamine but the plasma histamine value was doubled or trebled, indicating a release of histamine from cells to plasma. In both these respects the effects of trypsin are similar to those produced by antigen in sensitized animals ; KATZ (1940) demonstrated that when antigen is added to blood from a sensitized rabbit *in vitro*, there is a release of a considerable fraction of the cellular histamine to the plasma. —R. ALLCROFT.

SHOHL, A. T. (1939). **Mineral Metabolism.** —*Monogr. Ser. Amer. chem. Soc.* No. 82. pp. x + 384. New York : Reinhold Publishing Corporation. [8vo] [$5.00].

The material of this monograph is selected largely from data on human beings, although the more important results of other investigations are used to supplement such data and focus the main interest on physiology in the general sense. Disease aspects of mineral metabolism are not discussed from the therapeutic point of view, but are freely used to illustrate the functioning of physiological mechanisms under conditions of stress.

In the nature of the subject the choice has to be made between treating various physiological functions under each mineral element or discussing several elements under each function. The latter course has been chosen, although chapters 6 to 11 deal more specifically with mineral elements themselves. The material on each element is thus scattered throughout the book, but a good subject index enables the reader to reassemble all the data on a particular element to suit his own requirements.

An attempt is made to clarify the terminology often confusingly used in current literature. Thus in place of loose usage of " acid " and " base " the terms anions and cations are used for electronegative and electropositive elements or radicles in the ionized state, while the terms " anionogen " and " cationogen " are used when the elements are in the non-ionized state but can become ionized in the course of body processes. In the same way the term " electroneutrality " is used in preference to " acid-base equilibrium".

The book contains so much informative material that it is indispensable to workers on the subject, and it is no criticism to say that it omits much of special interest to the veterinarian. The bibliography at the end of each chapter, however, is sufficiently good to provide starting points for any reader who wishes to pursue special enquiries further, and is particularly good in drawing attention to review articles expanding particular topics with which the author has no space to deal.—H. H. GREEN.

LOGAN, M. A. (1940). **Recent Advances in the Chemistry of Calcification.**—*Physiol. Rev.* **20.** 522–560.

The problem of calcification in the animal body has in recent years been approached from a number of different aspects. Differentiation of various Ca fractions in the blood plasma has resulted in numerous studies of the physico-chemical relationships of Ca and PO_4 ions in the body. Consideration is given to work relating to the formation and composition of bone salts and of recent X-ray studies in this connexion. Other aspects of calcification considered include the absorption of Ca from the gut, the availability of Ca from various sources, the influences of growth and Ca reserves on absorption, the effect of vitamin D, and species differences on absorption and retention. The requirements of Ca and P for various species are discussed. Space is devoted to a consideration of the effects upon calcification of vitamins C and D, and of the hormones of the pituitary, parathyroid, thyroid, and other glands, including the sex hormones.

Much of the knowledge of the physiological and chemical factors concerned in calcification is unfortunately fragmentary, but L. hopes that by presenting the available state of knowledge further investigation of the subject will be stimulated.—ALFRED EDEN.

ROTHMAN, S. (1941). **Physiology of Itching.**—*Physiol. Rev.* **21.** 357–381.

" Itching is an unpleasant cutaneous sensation which provokes the desire to scratch ". This 200-year-old definition has not been modified in spite of advancing knowledge. " Superficial tickling " also corresponds to the above definition and it is shown in this review that itching and tickling are identical. Itching represents a sensory quality which is identical with that of protopathic pain; superficial tickling progresses to itching and itching to diffuse burning pain without critical change of the quality of sensation when the intensity of the stimulus is gradually increased. Whether itching, tickling or protopathic pain sensation is felt, depends on the frequency of impulses in the slow-conducting C fibres of Gasser and Erlanger. The whole body surface responds to itch stimuli, but the highest pruritic sensitivity is found around the large openings of the surface in the transitional tissues between skin and mucous membrane. The term " physiologic pruritus " is used to contrast the pruritus of pathologic processes with the itching which arises in response to weak stimuli such as slight rubbing, and slight changes in temperature and in pressure. The impulses resulting from such stimuli are of minimal intensity and scarcely enter the consciousness except in forced immobility, in boredom and in fatigue. The instinctive desire of animals for cleanliness is supposed to be caused by this minimal pruritus.

Evidence has been presented for the theory that itching following skin injury and itching in skin lesions based on hypersensitivity reactions may be caused by the liberation of histamine or histamine-like substances termed H-substance. The interpretation of certain pathologic processes in the skin, particularly the responses observed in anaphylactic and allergic skin reactions, can be based on this conception. Another fact in favour of the

histamine theory of itching in anaphylactic reactions is that pruritus may be the first or even the only symptom of the systemic anaphylactic shock in animal experiments as well as in human beings. But liberation of histamine or of a similar substance cannot be responsible for itching which occurs without visible changes in the skin as whealing or other inflammatory changes would be present at the site of liberation of histamine.

The central inducement of itching, the scratch reflex, and therapeutic considerations are briefly discussed.—R. A.

POISONS AND POISONING

—. (1940). **Toxicity of Potassium Salts.**—*Brit. med. J.* July 20th. 89.

From observations of electrocardiograms of human patients treated with K salts and experiments on nephrectomized rats given protein and K-rich foods, the recommendation is made that K salts should be used with the utmost caution in cases of cardiovascular disease and renal insufficiency, especially in view of the well known depressant action of K on the heart.—Alfred Eden.

Smith, M. I., & Stohlman, E. F. (1940). **Further Observations on the Influence of Dietary Protein on the Toxicity of Selenium.**—*J. Pharmacol.* **70.** 270–278.

Groups of rats were fed on a basal diet containing seleniferous wheat with a Se content of 10 p.p.m. with quantities of various proteins added. It was found that lactalbumin, ovalbumin, gelatin, wheat proteins, dried brewers' yeast, and desiccated liver afforded protection against the toxic effects of the naturally occurring wheat Se in a similar manner to the protection previously shown by casein. Glucosamine had only a partial, and lysine and methionine had no protective effect.

Further experiments with graded amounts of casein added to a diet containing added Se at a level of 15 p.p.m. as sodium selenite, showed that the degree of protection was related to the quantity of dietary protein. Cystine and methionine in amounts sufficient to support normal growth in rats on a diet containing only 4% casein failed to afford any protection against the toxic Se. 20% zein added to the diet of a further group of rats gave complete protection against the toxic effects of wheat Se.—Alfred Eden.

Landauer, W. (1940). **Studies on the Creeper Fowl. 13. The Effect of Selenium and the Asymmetry of Selenium-Induced Malformations.**—*J. exp. Zool.* **83.** 431–443.

Experiments were conducted with four groups of 22 females and one male each; two of the groups consisted of heterozygous Creeper pullets mated to Leghorn cockerels and the other two groups comprised normal pullets and Leghorn cockerels. The birds were fed exclusively on a mash having a selenium content of approximately 9·6 p.p.m. so that the daily intake of each bird was estimated to be between 0·5–1·0 mg. of organic selenium. Eggs were saved for incubation after the birds had been on the experimental diet for eight days. In the Creeper progenies early embryonic mortality was higher than in the normal ones and the teratological disturbances were more exaggerated. The results clearly demonstrated that the simultaneous presence of Se in the egg and of the Creeper mutation in the embryo produced an exaggerated effect. A high proportion of the malformations caused by the Se, showed an asymetrical expression; both in the material from Creeper and normal matings there was a tendency for the deformities of eyes and wings to be more common or extreme on the left side of the body while the reverse was true for the legs. These results also confirmed those of other workers with regard to the relatively high degree of resistance of laying hens to long-continued ingestion of a seleniferous diet, even fecundity being little affected, and also in regard to the drastic effect which such a diet has on embryo development within the eggs laid by such hens. This contrasts conspicuously with the effect of Se on mammals in which the toxic effects are visible long before the reproductive functions are impaired, and there is no evidence that embryonic deformities are even produced in mammals by maternal Se intoxication. Analyses of the livers and ovaries of ten birds showed that the Se content of large ova was higher than that of the liver or small ova. In mammals chronically poisoned with organic Se, the Se content of the liver was found to be higher than that of any other organ analysed [see Westfall & Smith —*V. B.* **11.** 403].—R. Allcroft.

Wilson, R. H., DeEds, F., & Cox, A. J., Jr. (1941). **Effects of Continued Cadmium Feeding.**—*J. Pharmacol.* **71.** 222–235.

Studies were made of the chronic toxicity of cadmium for albino rats. Given as the chloride, the effect of levels of Cd exceeding 3·1 mg. per 100 g. food was to decrease the rate of growth, this effect being more pronounced at higher levels of Cd feeding. Deaths also occurred progressively earlier with increasing concentrations until at the level of 100 mg. rats lived only a few days. Even with as little as 6·2 mg. severe anaemia resulted in the rats, the Hb levels dropping to 3·4 g. after 2–3 months, with a disproportionate decrease in the number of erythrocytes. No significant changes occurred in the white cell and differential count. The bone marrow was hyperplastic, suggesting that the marrow itself was not injured. An increase in the number of reticulocytes was found.

The most characteristic feature of Cd poisoning was the rapid bleaching of the incisor teeth even at levels down to 1·6 mg. This effect is similar to that of fluorine, although the possibility of an increase in the activity of the F in the diet in the presence of Cd was not excluded. Cardiac hypertrophy was also a marked feature; in the most severe cases a doubling of the heart weight occurred, this hypertrophy possibly being due to the severe anaemia. Adrenals, spleen, and kidneys were heavier than normal.

The chief histological findings were hypertrophy of the heart, focal necroses with some inflammatory reaction and fibrous tissue proliferation in the liver, and marked atrophy and inflammation in the pancreas. Hyperplasia of the spleen and slight epithelial swelling and cast formation in the kidneys constituted the principal remaining pathological findings.

—Alfred Eden.

Garcia, J. A. R. (1941). Ápropósito de una creencia muy generalizada. Tiene acción tóxica la hoja de Ombú (Pytolacca dioica L.)? Nota previa. [**The Toxicity of Ombu Leaves** (*Phytolacca dioica*). **Preliminary Note**].—*An. Fac. Vet., Montevideo.* **3.** 501–504.

The popular belief that *P. dioica* leaves are toxic was investigated. Hot and cold water extracts and alcoholic extracts of the whole leaf were given to nine dogs, one pig, one g. pig, and one rabbit. No toxic symptoms were observed in any of the animals except in two dogs which showed intestinal derangements. G. points out, however, that this provides no positive evidence of toxicity as the two animals came from a municipal depot and their previous history was unknown.—Miller Watson.

THERAPEUTICS

Albert, A. (1941). **Recent Advances in the Use of Acridine Antiseptics.**—*Med. J. Aust.* April 19th. 482–483.

A. considers the acridine antiseptics, especially proflavine, to be most suitable wound antiseptics because they are effective against all types of pathogenic bacteria, without suppression of phagocytosis, in high dilution and in the presence of protein, are non-injurious to tissue, and are cheap. Two new acridine compounds are described; (1) 2 : 7-diaminoacridine, a red substance, has antiseptic properties equal to those of proflavine but is only one-tenth as toxic and is claimed to be the least injurious of all known antiseptics to the living brain; (2) 5-aminoacridine is colourless in solution and therefore suitable for the treatment of lesions of the face and fauces. Methods of producing proflavine in Australia from raw materials available locally have been evolved to meet possible war needs.

—W. I. B. Beveridge.

Taffel, M., & Harvey, S. C. (1941). **Effect of Local Application of Sulfanilamide upon Wound Healing.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 202–205.

The effect of the local application of sulphanilamide on the healing of a soft tissue wound was observed in a group of 57 rats. The stomach was exposed through an incision in the anterior abdominal wall and 0·2 ml. of a 3% suspension of sulphanilamide in normal saline was injected into the wall of the cardia causing an oedematous weal involving all the layers of the stomach wall. The finely powdered crystals of the drug appeared to be evenly distributed throughout the oedematous zone and a wound was made through the weal directly into the lumen of the stomach. After suturing and closing the abdominal wall, 0·2 ml. of normal saline was injected into the subcutaneous tissues of the groin. A control group of 54 animals received similar treatment except that 0·2 ml. of saline was injected into

the stomach and 0·2 ml. of sulphanilamide into the groin. The tensile strength of the wound was taken as an index of healing and histological studies were made of the wounds. The results showed that the local application of sulphanilamide crystals in the edges and in the immediate vicinity of the wounds did not affect the healing of the wounds.—R. ALLCROFT.

BRICKER, E. M., & GRAHAM, E. A. (1939). **The Inhibitory Effect of Sulphanilamide on Wound Healing.**—*J. Amer. med. Ass.* **112.** 2593–2594. [Authors' summary copied *verbatim*].

Sulfanilamide given to dogs in doses comparable to the therapeutic doses used by human beings, has an inhibiting effect on the healing of uninfected incised wounds, as determined by the tensile strength.

BIGGER, J. W., & MCNALLY, P. A. (1941). **The Action of Certain Sulphonamide Drugs on the Growth of Bacteria in Urine.**—*J. Path. Bact.* **52.** 247–261.

This article sets out, mainly in tabular form, the results of an investigation of the action of sulphapyridine, sulphanilamide, sulphathiazole, and sulphamethylthiazole on *Proteus vulgaris*, *Bacterium coli*, *Staphylococcus pyogenes* and *Streptococcus faecalis* in urine. The investigation included experiments carried out with an "artificial bladder" which is an ingenious piece of apparatus portending to imitate, to some extent, conditions existing in the human urinary tract.

Results show that in concentrations which are readily obtainable in the urine following the administration of the drug in man, sulphapyridine and sulphathiazole in *in vitro* tests were capable of sterilizing cultures of *P. vulgaris*, *Bact. coli*, and *Staph. pyogenes*, except when large inocula were used. In the case of *P. vulgaris* an alkaline pH increased the bacteriacidal action of sulphapyridine which was the most effective of the drugs under test. None of the drugs was effective against *Str. faecalis*. In the "bladder" experiments, sulphapyridine and sulphathiazole were even more effective than they were in the static flask experiments.—ALEX. THOMSON.

I. STRAUSS, E., & FINLAND, M. (1941). **Selective Inhibition of Sulfonamide Drugs by Various Media.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 428–431.

II. STRAUSS, E., & FINLAND, M. (1941). **Bacteriostatic and Bactericidal Action of Sulfadiazine in Vitro on Gram-Negative Bacteria.**—*Ibid.* 432–434.

I. Growth curves with stock strains of type III and type IV pneumococci were made to compare the degree of inhibition of sulphathiazole and sulphadiazine in a given medium. These drugs were inhibited to varying degrees in different media. In blood broth, sulphadiazine was selectively inhibited to a greater degree than sulphathiazole. In human serum, sulphathiazole was inhibited to a greater degree than in blood broth, human plasma, defibrinated blood or in horse serum, while sulphadiazine was inhibited to about the same degree in these media. In liver-infusion media, the two drugs were equally bactericidal in concentrations of 5 mg. % or more, but sulphathiazole was more effective in lower concentrations. These results emphasize the importance of the proper selection of media for *in vitro* tests of sulphonamide drugs, and the possible error of attempting to compare therapeutic efficacy of different sulphonamides on the basis of results of *in vitro* tests is discussed.

II. A comparison was made of the bactericidal and bacteriostatic activity *in vitro* of sulphadiazine and sulphathiazole on a number of common pathogenic Gram-negative bacteria in a simple semi-synthetic medium. The two drugs were found to be bactericidal in concentrations as low as 1 or 2 mg. % on *Bacterium coli*, *Bact. flexneri*, and *Salmonella cholerae-suis*, and at 5 mg. % on *S. enteritidis*, *S. schottmülleri* and *S. typhi-murium*. In the latter concentration they were bacteriostatic for *S. paratyphi* and at 10 mg. % were bactericidal for the Friedländer bacillus type A.—R. ALLCROFT.

SPINK, W. W., & JERMSTA, J. (1941). **Effect of Sulfonamide Compounds upon Growth of Staphylococci in Presence and Absence of p-Aminobenzoic Acid.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 395–398.

Studies were made comparing the bacteriostatic effect of sulphanilamide, sulphapyridine, sulphathiazole, and sulphadiazine upon four strains of *Staphylococcus aureus*, a synthetic medium similar to that of GLADSTONE (1937) being used. At the same time the inhibitory effect of *p*-aminobenzoic acid on the bacteriostatic action of these compounds was investigated. Sulphathiazole and sulphadiazine had a greater inhibitory effect upon growth than sulphapyridine and sulphanilamide; sulpha-

thiazole exerted a greater effect than sulphadiazine. *P*-aminobenzoic acid inhibited the bacteriostatic action of all the compounds, but it was shown that the greater the effect of a compound on the growth of staphylococci, the less inhibitory was *p*-aminobenzoic acid against this bacteriostatic action of the compound.
—R. ALLCROFT.

NETER, E. (1941). **Combined Bacteriostatic Activity of Sulfanilamide and Azochloramid upon Group A Hemolytic Streptococcus and Enterococcus.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 303–305.

It is known that the effectiveness of sulphanilamide may be markedly increased in the presence of other antibacterial agents, notably immune sera. In order to determine whether a similar synergistic action could be obtained by the combined use of two different chemotherapeutic substances, the activity of sulphanilamide and azochloramid (N, N′-dichloroazodicarboxamidine) was investigated against a strain of β haemolytic streptococcus and a strain of haemolytic enterococcus. It was found that the combination of sulphanilamide and azochloramid exerted greater bacteriostatic activity against haemolytic streptococci than either compound alone; in suitable dilutions these two agents were more effective than four times the concentration of sulphanilamide alone and twice the concentration of azochloramid alone. Experiments with haemolytic enterococcus showed that a combination of the two agents completely prevented growth and exerted greater bacteriostatic activity than azochloramid alone even in twice the concentration.—R. ALLCROFT.

SCHMIDT, L. H., & SESLER, C. L. (1941). **The Response of Sulfapyridine-Resistant Pneumococci to Hydroxyethylapocupreine.**—*J. Pharmacol.* **72.** 311–316. [Authors' summary copied *verbatim*].

A comparison was made of the activity of hydroxyethylapocupreine and sulfapyridine against infections in mice with parent and sulfapyridine-fast pneumococci. Infections with the parent organisms were susceptible to treatment with sulfapyridine, whereas infections with the " fast " organisms were not. On the other hand, hydroxyethylapocupreine was equally effective against infections with parent and sulfapyridine-resistant strains. However, hydroxyethylapocupreine was less effective than sulfapyridine against infections with most of the parent organisms.

KING, J. T., & HENSCHEL, A. F. (1941). **Bacteriostatic Effect of Paranitrobenzoic Acid on Pneumococci *in Vitro*.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 400–402.

The bacteriostatic effect of *p*-nitrobenzoic acid and its sodium salt on pneumococci type II was found to be similar to that exerted by sulphathiazole *in vitro*; the average inhibition of colony diameter for 12 series was 61·0% for sulphathiazole and 54·5% for *p*-nitrobenzoic acid and its salt.—R. ALLCROFT.

ROSENTHAL, S. M., & BAUER, H. (1941). **Trypanocidal Action of 3-Nitrobenzoic Acid and Some Derivatives.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 335–337.

As various sulphonamide derivatives have been shown to have no action on *Trypanosoma equiperdum*, the effect of 3-nitrobenzoic acid and some derivatives was investigated on mice inoculated intraperitoneally with quantities of trypanosomes that would cause death in 3–5 days. A list is given of 12 compounds which show some activity, the greatest effect being obtained with 3-nitrobenzoate sodium which cleared the parasites from the blood of most animals after six days' therapy with subcutaneous injection, but the incidence of relapses was high and only 16% of the series remained free from parasites.—R. ALLCROFT.

FINCHER, M. G., & GIBBONS, W. J. (1941). **Phenothiazine in Emaciated Horses.**—*Cornell Vet.* **31.** 220–223.

Seventy emaciated horses, whose weights varied from 200–900 lb., were given doses of 15–45 g. Eight of the 20 were ill 24–36 hours after treatment. The most constant symptoms were constipation, icterus, paleness of mucous membranes, and rise in temperature (102·6°–104°F.). Animals were found lying down as if suffering slight colicky pain. Two animals died, one within 24 hours of the appearance of symptoms and the other 17 days after treatment.—W. J. IRONSIDE.

SWANSON, L. E., & CARLISLE, B. E. (1941). **Phenothiazine as an Anthelmintic for Cattle Under Field Conditions.**—*Vet. Med.* **36.** 312–315.

Some 500 animals in seven herds, varying in age from calves to adults, were treated after fasting for 18–20 hours with doses ranging from 30 g. for animals 3–4 months old to 80 g.

for adults, and were kept under observation for six months; all but 2% showed rapid and marked improvement. A few animals were upset on the day following treatment but recovered by the next day.—W. J. Ironside.

Leiper, J. W. G., Peters, B. G., & Clapham, P. A. (1941). **A Controlled Experiment with Phenothiazine in Sheep.**—*J. Helminth.* **19.** 25–34.

Studies were made of the effect of phenothiazine, given either as a powder or in tablet form at the level of 1 g. per kg. bodyweight, upon the worm burdens, live weights and egg counts of lambs. The whole experiment and results were subjected to statistical analysis in the manner previously described [see *V. B.* **12.** 59]. On six lambs this level of dosing with phenothiazine was without effect upon the worm burden. Judging by egg counts upon 12 lambs before and after treatment, it significantly reduced the egg output without reducing the actual number of worms, more effective results being obtained with the powder than with the tablet form of the drug. The powder had no effect upon live weight of the lambs during the short course of the experiment, but the tablets caused a significant decrease in live weight.

The less effective action of tablets as compared with powder is attributed to the failure of the tablets to disintegrate thoroughly in the alimentary tract. The authors conclude by stating that, by considering all the criteria of efficacy and the relatively high cost of phenothiazine a dosage of 1 g. per kg. gives results of no practical interest to sheep farmers, judged by the results of the present experiment.

[Certain controversial points are not discussed in this abstract, and the reader interested in these results, which are contrary to many reported in the literature, is advised to refer to the original.]—Alfred Eden.

Faust, E. C., & Thomen, L. F. (1941). **Parasiticidal Properties of the Proteolytic Enzyme Ficin.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 485–487.

A comparison was made of the parasiticidal properties of the refrigerated latex of *Ficus glabrata*, chemically preserved latex (0·1–1·0% sodium benzoate), the semi-refined crystoid (sealed *in vacuo*), and the amorphous ficin. *In vitro* tests showed some digestive action of each substance on egg albumin coagulated by heat in capillary tubes, on living pig *Ascaris*, and on living dog whipworms. The unpreserved, refrigerated crude latex was consistently the most efficient paraciticide and the preserved latex somewhat less effective. A 10% solution of the freshly opened crystoid compared favourably with the refrigerated latex, but exposure to air rapidly diminished its potency. The amorphous ficin, which was relatively stable, was only about half as efficient as the fresh crystoid. *In vivo* observations of these products were made on 80 dogs infected with hookworms, whipworms, ascarids, tapeworms, and *Entamoeba histolytica*. The most specific action occurred on whipworms, provided the large bowel was previously free of faeces. The effect on hookworms was less satisfactory and no product was consistently efficient for dog ascarids; the efficiency for tapeworms was essentially nil. In ten animals treated with the fresh crystoid and 14 with the amorphous ficin, trophozoites of *E. histolytica* in the wall of the large bowel became dwarfed and inactive and at times were found dead *in situ*.—R. A.

I. Henle, G., & Zittle, C. A. (1941). **Effect of Gramicidin on Metabolism of Bovine Spermatozoa.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 193–198.

II. Heilman, D., & Herrell, W. E. (1941). **Mode of Action of Gramicidin.**—*Ibid.* 480–484.

I. Gramicidin has been shown to have a toxic effect when injected intravenously into animals and to act as a haemolytic agent in low concentrations [see *V. B.* **12.** R1–R6]. As spermatozoa are a type of mammalian cell and appeared suitable for such an investigation the effect of gramicidin on bovine spermatozoa was studied in an attempt to throw some light on this observed toxicity. Crude and purified gramicidin, after an initial stimulation of the oxygen uptake, inhibited completely the O_2 consumption in Ringer phosphate of acid pH and rendered the cells immobile. When sufficiently small amounts of gramicidin (0·001 mg. per ml. suspension) were used only stimulation was observed during the period of observation (180 min.). In alkaline phosphate buffer only the increase of O_2 consumption was noted. But in Ringer bicarbonate medium of the same pH, the respiration was again greatly inhibited. Aerobic as well as anaerobic glycolysis was depressed about 40% and the motility of the spermatozoa markedly impaired.

Tyrocidine in concentrations of 0·05 mg. per ml. suspension caused a small reduction in glycolysis and in the O_2 uptake.

From these results it is suggested that the toxic action of gramicidin may be exerted through the enzymes involved in respiration and glycolysis.

II. Because of some points of similarity between gramicidin and tyrocidine and certain detergents, a study was made of the ability of gramicidin and tyrocidine to depress the surface tension of aqueous solutions. Both caused a rapid decrease of surface tension, but tyrocidine was more active in this respect than gramicidin. Addition of organic solvents such as glycerin which increases the solubility of gramicidin, improved the ability of this agent to depress surface tension. Serum decreased the activity of tyrocidine less than it did the activity of gramicidin, sodium oleate, and aerosol OT (dioctyl ester of suphonated succinic acid). The bactericidal and haemolytic effects of gramicidin were destroyed by heat, but its property of altering surface tension is heat stable.—R. Allcroft.

Brass, H. (1940). Ein Beitrag zur Ultrakurzwellentherapie in der Veterinärmedizin. **[Ultra Short Wave Therapy in Veterinary Medicine].**—*Berl. Münch. tierärztl. Wschr.* Sept. 6th. 429–432.

The apparatus and the precautions to be taken are described. Exposures of 15–45 min. were given. The waves penetrate deeply (unlike diathermy) and cause dilatation of the arterioles and capillaries of prolonged duration. Examples of successful use of ultra short wave therapy in various inflammatory and painful conditions (*e.g.* stomatitis, pharyngitis, and strangles in horses, and paraplegia, rheumatism, and prostatitis in dogs) are given. The animals remained quiet during the treatment and B. has the impression that pain was relieved.

—J. M. Robson.

PUBLIC HEALTH

Cowley, R. (1940). **Sanitary Milk Control Situation in Havana.**—*J. Milk Technol.* **3.** 132–136.

The milk supply of Havana is derived from farms in the vicinity of the city, the most distant farm being 120 miles away. The cows have low milk yields. The daily fresh milk consumption is only ½ pint per head of the population and the bulk of the supply is raw milk from producer-distributors.

The law enacts that milk must be delivered in the city during restricted hours and by specified routes in conspicuously painted vehicles, and a producer-distributor must limit his supply to that produced by his own herd and must keep records of his animals. The farms are under monthly veterinary supervision and tuberculin tested twice yearly. Market milk must conform to a standard of 3% butter fat and 8% solids not fat and have a bacterial count of less than 100,000 per ml. for raw milk. Milk intended for pasteurization must have a count not exceeding 1 million, whilst after pasteurization the count must not exceed 50,000 per ml.

There is little demand for cream. The Cuban practice of boiling milk just before use prevents milk-borne epidemics and there is little public demand for pasteurization.

Recently, improvement in the production of milk has been marked and a " seal of guarantee" is awarded to producers and dealers who market milk of low bacterial count and maintained at a low temperature, from farms maintaining satisfactory methods of production.

—H. E. Bywater.

TECHNIQUE AND APPARATUS

Hohn, J. (1940). Ein neuer Einährboden zur Tuberkelbazillenkultur (Substrat 4) und ein einfacher Verschluss für die Eiröhrchen (Kapsenberg-Kappe). **[A New Egg Medium (Substrate 4) for Culture of Tubercle Bacilli and a Simple Plug for Culture Tubes].**—*Zbl. Bakt. I. (Orig.).* **145.** 145–156.

A new base for egg media (substrate 4) is described. This consists of potato emulsified in glycerine with the addition of the new iron-containing Lockemann's solution. It is especially recommended for cultivation of bovine type tubercle bacilli. A plug for culture tubes is also described; it is said to be convenient and to be specially useful for preventing

desiccation of the contents of tubes.—D. L. R.

Ryu, E. (1940). **On the Gram-Differentiation of Bacteria by the Simplest Method. III. The Sulfuric Acid Methods.**—*Jap. J. vet. Sci.* **2.** 491–496. [In Japanese: abst. from English summary].

Two methods have already been reported by R. for the Gram-differentiation of bacteria [see *V. B.* **10.** 393 and 562]. The present method consists of putting half a drop of concentrated H_2SO_4 on a slide; half a loopful of a young culture on agar medium is added and thoroughly mixed with a platinum loop. Gram-negative bacteria dissolve instantly and the bacterial suspension becomes transparent, while Gram-positive ones show no change and remain as a white turbid suspension. It is claimed that this method is simpler and better than the two previous ones and that the results agree absolutely with those of Gram staining. [See also *V. B.* **11.** 195].

Kay, W. W., & Whitehead, R. (1941). **The Role of Impurities and Mixtures of Isomers in the Staining of Fat by Commercial Sudans.**—*J. Path. Bact.* **53.** 279–286.

Commercial sudans show better fat staining properties than purified ones as the colour of the stained fat is heightened by impurities. Altogether the fat-staining properties of 14 sudan III and eight sudan IV dyes were examined and the routine sudan IV proved the most satisfactory as it exhibited certain advantages over other dyes tested. Fat is stained red which shows good contrast against the background of a section; it stains strongly and its moderately bright colour is a great advantage.—C. Horton Smith.

Quade, R. H. (1939). **A New Staining Technic Originated to Demonstrate the Capsular Cells of the Sympathetic Nervous System.**—*Proc. Mayo Clin.* **14.** 555–559.

The chief constituents of this stain are ferric chloride and tannic acid. The principle is that the tannin attaches itself to the protein structure of a tissue and so produces a protein complex. The ferric salt will combine with this, producing a variety of colours, which will be intensified on oxidation. Theoretically, the preparation will stain tissues differentially in proportion to the differences in the protein complexes present.

The paraffin section cut from formalin-fixed material is immersed in xylol and then in dioxane to remove formalin from the tissue. It is then counterstained with azocarmine for 20 sec. The iron-gallate stain is now applied. The section is then fixed with osmic acid, cleared with dioxane and calcium oxide (to absorb water), and mounted in gum dammar.

It is suggested that this stain will possibly be of use on cells of the nervous system generally and on cells of other organs. Full technical details are given.—C. W. Ottaway.

Baumann, R., & Kment, A. (1941). Histologische Schnelluntersuchung des Zentralnervensystems. [**Rapid Histological Examination of the Central Nervous System**].—*Arch. wiss. prakt. Tierheilk.* **76.** 231–235.

The authors draw attention to the fact that a rapid examination of the nervous system is helpful in the diagnosis of certain diseases. A frozen section stained direct showed indistinct and opaque spots due to the presence of the complicated myelin network. Methods of clearing this with alcohol were tried, and the authors recommend that a frozen section should be immersed in 50% alcohol for 30 min. before staining to clear the section of myelin. —C. W. Ottaway.

I. Söntgen, K. (1940). Die Lumineszenzlampe im Dienste der Tuberkulosebekämpfung beim Rinde. [**The Use of the Fluorescence Lamp in the Diagnosis of Bovine TB.**].—*Berl. Münch. tierärztl. Wschr.* July 12th. 336–337.

II. Busch, G. (1940). Fluoreszenzmikroskopischer Nachweis von Tuberkelbakterien beim Rinde. [**Fluorescence-Microscopic Demonstration of Tubercle Bacilli in Cattle**].—*Dtsch. tierärztl. Wschr.* **48.** 587–589.

I. Following the method whereby TB. in human beings was diagnosed speedily and accurately by the use of the fluorescence lamp, S. examined 300 smears from suspected cattle. Controls were made with the Ziehl-Neelsen method and a combination of Ziehl-Neelsen with fluorochrome (the stain used with the fluorescent lamp). As the results obtained were practically identical S. suggests that there is no advantage in the use of this lamp.

II. 602 tracheal swabs were examined by fluorescent illumination for the presence of

tubercle bacilli. Smears were also made with Jötten-Haarmann stain. On P.M. confirmation of the diagnosis, a greater percentage was found to be correct with the fluorescence-microscopic method than when non-fluorescent technique was used. The technique employed was a slight modification of the original. B. concludes that this method is reliable for the diagnosis of TB. in cattle.—C. W. Ottaway.

Turner, T. B. (1938). **The Preservation of Virulent Treponema pallidum and Treponema pertenue in the Frozen State; with a Note on the Preservation of Filtrable Viruses.**—*J. exp. Med.* **67.** 61–78. [Author's summary copied *verbatim*].

1. A simple method for freezing and maintaining tissue specimens in a mixture of solid carbon dioxide and 95 per cent. ethyl alcohol at a temperature approximating –78°C. is described.

2. When frozen and maintained at this temperature *Treponema pallidum* and *Treponema pertenue*, upon thawing, exhibited normal morphology and motility and their virulence for rabbits was not appreciably altered after periods of at least 1 year. This applied to a number of different strains of each organism. The infectivity of material in which treponemes were scant was maintained as well as of material in which they were abundant.

3. At temperatures of –10°C. and –20°C. syphilis treponemes did not survive as long as 2 months. Death of the organism occurred not at the time of freezing but during the maintenance period.

4. Treponemes did not commonly survive freezing and desiccation, although one lot of dried material which contained *T. pallidum* was infective for rabbits 1 day after desiccation.

5. The viruses of human influenza, yellow fever, and spontaneous encephalomyelitis of mice when frozen and maintained at –78°C. showed substantially the same titer after 6 months as before freezing.

6. Certain practical applications of the method are suggested.

Bregante, L. J. (1941). Contribución al estudio de la identificación del bovino y equino. [**Identification of Cattle and Horses**].—*An. Fac. Vet., Montevideo.* **3.** 533–549.

B. suggests a method of identification of cattle and horses based on the individual characteristics of the whorl of hair on the frontal region of the head.

The general type of whorl or "parting" is first noted. It may be spiral, circular, like a question-mark, like a fleur-de-lis, a bundle of faggots, or irregular. When suitable the term "clockwise" or "anti-clockwise" may be applied. The next point to be noted is the location of the whorl. This is done by measurements from fixed points such as the internal canthus of the eye and a median line from the poll down the face. The angle of the main line of the whorl in relation to a line between the eyes is also noted, as is the over-all length of the "parting".

The final process is the making of a "trichograph". The hair over the area is clipped short so that the hairs are not more than 1 mm. long. The area is then cleaned of all dirt and greasy matter and painted with lamp-black in linseed oil, a soft brush being used. A sheet of paper of dull surface is then laid on the area and pressed firmly by hand. This results in an impression showing the flow of the hair in its characteristic pattern. A number of photographs illustrate such "trichographs". B. claims that the hair pattern does not alter during the animal's life, as the hairs always grow from the same follicles.—Miller Watson.

Andrews, J. S., & Brooks, H. J. (1941). **A Quantitative Method for the Determination of Blood in the Feces of Sheep by Means of the Evelyn Photoelectric Colorimeter.**—*J. biol. Chem.* **133.** 341–351.

A colorimetric method for the estimation of blood in faeces of sheep is described, based on the well known benzidine-acetic acid-H_2O_2 reaction. This method was used to determine the amount of blood present in the faeces of sheep drenched with known volumes of calf blood, and it was found that from 25–50% of the ingested blood was recovered, all within 72 hours of the time of drenching. The limits of the method and its applicability to other types of faeces are discussed, and it is suggested that it may be of some value in evaluating gastro-intestinal haemorrhages in sheep, particularly those due to parasitic infestations.

—Alfred Eden.

Nitzulesco, V., Manoilesco, C., & Popovici, R. (1939). Sur la recherche des oeufs

d'helminthes par la méthode de Willis-Hung. **[Search for Helminth Eggs by the Willis-Hung Method].**—*Bull. Acad. Med. Roumanie.* **7.** 86–99.

The authors consider that the techniques devised for concentrating helminth ova by so-called chemical methods, such as the Telemann method or its modifications using HCl and ether, and the Rivas method using acetic acid and ether, show less efficiency than is claimed for them in the detection of *Ascaris*, *Enterobius*, and *Hymenolepis* eggs. Tabular statements show that for concentrating the ova of these helminths, Hung's modification of the Willis saturated salt solution flotation method, in which floating coverslips are used in place of microscope slides, gives better results. Human faeces were used for all observations on the different techniques.—J. N. OLDHAM.

PETERSEN, W. E., SHAW, J. C., & VISSCHER, M. B. (1941). **A Technique for Perfusing Excised Bovine Mammary Glands.**—*J. Dairy Sci.* **24.** 139–146.

A description is given of the perfusion apparatus, the essential features of which are :– a reservoir for the blood, a pulsating mechanism, a mechanism for oxygenating the blood, and provisions for regulating the blood pressure, for warming the blood, for elevating the blood into the reservoir, and for suspending the excised gland. Some important details in the technique of perfusion of the gland are discussed together with directions for excising, care of the excised gland, and the use of anticoagulants.—R. A.

SPURLOCK, G. M. (1941). **A Stomach Tube for Mice.**—*J. Parasit.* **27.** 93–94.

S. describes the preparation of a flexible stomach tube made by rolling up strips of cellophane.—M. L. BINGHAM.

MACDONALD, A. J. (1940). **The Feeding of Poultry.**—*Indian Fmg.* **1.** 318–322.

In addition to a brief review of the nutritive requirements for growth and egg production, details are given of rations and methods of feeding successfully adopted at the poultry section of the Imperial Veterinary Research Institute, Izatnagar.

RENTSCHLER, H. C., NAGY, R., & MOUROMSEFF, G. (1941). **Bactericidal Effect of Ultraviolet Radiation.**—*J. Bact.* **41.** 745–774.

The effect was investigated of ultra-violet irradiation of bacteria, mainly *Bacterium coli*. The method of effecting the radiation and of its measurement is described in detail. Many experiments were carried out in which seeded plates were exposed to different amounts of radiation for varying lengths of time and photographs of such plates, following incubation, are contained in the body of the article.

The effect of radiation was very variable and the survival of an organism depended on its inherent resistance at the time of exposure. Resistivity varied greatly in cultures containing organisms in different phases of their life-cycles and varied to some extent at the same phase of a life-cycle.

It was found that a sublethal dose of ultra-violet radiation retarded the rate of development of colonies and that the temperature of the organism at the time of exposure had little influence on the result, so long as such temperature was insufficient to damage the bacterial cells.

An apparent variation in the resistance of bacteria of different types to ultra-violet radiation is believed to be due more to the clumping of the organisms and subsequent shielding from the effect of the rays, than to an actual variation in resistance of individual organisms.—ALEX. THOMSON.

GERSH, I. (1941). **Recent Developments in Histochemistry.**—*Physiol. Rev.* **21.** 242–266.

This review article deals chiefly with the advances made in the more conventional aspects of the histochemistry of higher animals during the last decade. The relative values of different methods employed for estimating qualitatively and quantitatively the presence of inorganic ions, enzymes, esters, and vitamins in tissues are discussed. With the development of ultra-violet absorption methods great advances have been made in chemical studies of the nucleus, but few significant contributions have been made recently on the histochemistry of the endocrine glands. With the further development of concepts and methods in common use in the physical sciences, it should be possible to estimate quantitatively the substances present in minute concentrations in the tissues, and thus throw a new light on the functional association between cells in the same or different tissues and the role played by cellular components in metabolic mechanisms.—R. ALLCROFT.

MISCELLANEOUS

CARMICHAEL, J. (No date). **The Work of the Entebbe Veterinary School.**—*Uganda Teacher's J.* **1.** No. 3. Reprint pp. 2.

A brief note on the school. The veterinary students take the basic subjects of biology, chemistry, and physics at Makerere College. It is hoped that in future mammalian physiology and comparative anatomy will be taken at the new medical school at Mulago.

At Entebbe there is an up-to-date hostel and the veterinary teaching is done at the veterinary research laboratory. The course is five years.

—. (1938). Laboratório Central de Patologia Veterinária 1913–1938. **[The Central Laboratory of Veterinary Pathology, Lisbon, 1913-1938].**—*Repos. Lab. Pat. vet., Lisboa.* **4.** 3–19.

A history is given of the laboratory from its foundation in 1913 up to 1938. Some statistics are included.

In 1913 there were seven persons on the staff of the laboratory; by 1938 the number had risen to 61.

Biological and other diagnostic tests carried out in 1913 were 422 in number. By 1938 these had increased to 15,675. In 1913, 7,219 ml. of prophylactic serum were produced, while in 1938 the amount was 6,216,583 ml.

From 1913–17 the number of doses of antisera and vaccines produced was 1,979. This increased to 1,208,733 during the period 1933–37. In the same period 10,536 ml. of mallein and tuberculin were produced.

The paper includes a long list of the publications issued by the laboratory. A number of photographs of the laboratory and annexes are reproduced.—MILLER WATSON.

BETZLER, M. (1939). Der Heeresveterinärdienst. **[The Army Veterinary Service].**—*Dtsch. tierärztl. Wschr.* **47.** 623–626.

This is a lecture to veterinary students under training for the German army veterinary service at the Army Veterinary Academy, Hanover. The organization is explained, the scope of the work is outlined, and some information is given on army disciplinary matters affecting the veterinary corps personnel.—J. E.

WEISGERBER. (1939). Fortschritte des Geflügel-Gesundheitsdienstes im Jahre 1938. Die neuen Wege, chronische Zuchtseuchen durch wirtschaftliche Massnahmen zu bekämpfen. **[Germany: Progress of the Poultry Health Service in the Year 1938. New Economic Control Measures for Breeding Diseases].**—*Berl. Münch. tierärztl. Wschr.* Aug. 18th. 526–529.

This is a commentary on the German poultry health service and its progress during the first two years' work (1937 and 1938) together with figures for pullorum-disease testing and P.M. examinations (the latter for 738 only).

The service operates through and by the *Tiergesundheitsämter* and veterinary colleges, to the total number of 22 centres. They control the health aspect of specially approved hatcheries and breeding farms, which supply stock to ordinary poultry keepers according to a State system of financial aid. These special farms numbered 1,300 in 1938: W. stated that this figure would increase by 50% in 1939. Pullorum-disease testing was organized to occupy the minimum time, being effected largely by the rapid agglutination test on birds selected at random (about 10% in each flock). In case of any reactions all the birds were eventually tested. At testing time the birds were also examined for other diseases and culled if advisable. All dead hens were required to be sent in for diagnosis. In 1938 1,370 farms with 797,570 birds were blood tested: 39% were free from bacillary white diarrhoea, an increase of 5% over 1937.

A table gives the results of P.M. diagnostic work on 13,000 fowls and 9,600 chicks in 1938. The commonest causes of death in hens were urogenital disease 22%, followed by leucosis 14%, parasites 9%, and gout 8·5%. Bacillary white diarrhoea accounted for 26% of the deaths in chicks and coccidiosis for 14%. These and the other causes of death are discussed.

It is stated that in 1939 random blood-sample testing was to extend to 25% of the flock and if one bird reacted, then every bird in the flock was to be tested. Reactors were to be marked pending culling, as opportunity offered.—J. E.

WIEMANN. (1940). Deutsche Veterinärverwaltung im Generalgouvernement Polen. **[German Veterinary Organization in the German Protectorate of Poland].**—*Dtsch. tierärztl. Wschr.* **48.** 535–539.

W. gives much statistical and general information on agricultural conditions and productivity in the former Polish republic and in the recently constituted German protectorate, which comprises roughly the south-eastern half of that part of Poland seized by Germany in 1939. It is good farm land with a peasant (smallholding) population, very rich in horses, but with poor quality cattle and not many pigs or sheep in comparison with Germany.

Veterinary care of livestock was poorly developed and has been reorganized, with Germans (to the number of 13) in the higher positions in the four districts of Warsaw, Krakow, Lublin, and Radom. Polish veterinarians occupy 76 posts in the State veterinary service and another 288 are engaged in meat inspection.

The animal disease situation remained favourable in spite of the war, only rabies appearing to increase markedly and equine mange to a lesser extent. Swine erysipelas, which has for many years been enzootic and was controlled universally by serum-culture immunization, increased somewhat but is being checked by a resumption of serum and culture production at certain laboratories, of which the chief one is that at Pulawy.

Milk production and hygiene have been poor by modern standards, and the utilization of animal carcasses was hardly provided for at all. Market and meat inspection had been organized on the German model and were good except in country districts, but there was almost no provision made for bacteriological food inspection. The Germans are improving all these services. They have put a stop to the Jewish slaughtering method.—J. E.

BARTELS. (1940). Der Aufbau des Veterinärwesens im Reichsgau Wartheland. [**The Development of Veterinary Work in Wartheland**].—*Dtsch. tierärztl. Wschr.* **48.** 519–523.

B., who was appointed the principal veterinary officer of the newly constituted *Reichsgau* of Wartheland [*V. B.* **11.** 880.], describes briefly the disorganization in the livestock industry consequent on the German invasion and the early reorganization of veterinary work.

The *Gau* is divided into three *Regierungsbezirke*, *viz*, Posen, Hohensalza, and Litzmannstadt (Lodz), which together contain 44 *Kreise*, half of which were provided with German *Kreistierärzte* at the time of writing. Although the latter carry out meat inspection and private practice as well as State veterinary police work, there is still an acute need for veterinarians. A veterinary investigation office has been opened at Posen and is directed by Dr SCHOOP.

The most important diseases requiring control in 1940 were rabies, foot and mouth disease, and swine erysipelas. Appropriate regulations for this purpose have been enacted. There is no glanders, dourine, or bovine contagious pleuro-pneumonia. Bovine tuberculosis is very prevalent according to abattoir statistics (48% in 8,317 cattle and 6·5% in 812,000 pigs slaughtered during a four-month period).

Veterinary police work in connexion with import and export of animals and animal products has been quickly organized and plans have been made to train German meat and trichinosis lay inspectors for country work. An animal disease statistics service was started in March, 1940.—J. E.

SEMMLER, W. (1941). Das zivile Veterinärwesen in Frankreich. [**Civil Veterinary Affairs in France**].—*Tierärztl. Rdsch.* **47.** 309–311, 324–326 and 335–338.

There is no single law on the control of livestock diseases, but numerous separate decrees exist by which control is exercised through local (department) authorities. There is very little State financial support for the compensation of farmers, etc. for loss by compulsory slaughter. Only in the case of glanders does it exist, and in the case of bovine TB. grants are obtainable for the improvement of buildings. The following diseases are notifiable :– anthrax, bovine TB., glanders, swine erysipelas, swine plague, *Brucella melitensis* infection in goats and sheep, blackleg, bovine contagious pleuro-pneumonia, dourine, bovine anaplasmosis, rinderpest, sheep pox, equine infectious anaemia, foot and mouth disease, psittacosis, rabies, and mange in equines and small ruminants.

S. states that F. & M. disease was widespread in France at the beginning of 1941, but was mild. A few cases of glanders appeared near Paris in 1940; E.I.A. is enzootic in ten north-eastern departments and rabies in 21 departments of unoccupied France, whilst mange is widespread. In occupied France anthrax, swine erysipelas, blackleg, swine fever and sheep scab have been observed.

Meat inspection is regulated chiefly by the

law of 1933 on TB. There is no comprehensive meat inspection law as in Germany. There exist orders whereby all animal carcasses intended for human consumption must be inspected. Both veterinary and lay inspectors are employed and are appointed by the Ministry of Agriculture or by mayors of towns. S. states that the inspection is in practice superficial and that the lay inspectors, who receive no standardized instruction, merely call in veterinary assistance as they themselves think necessary. Abattoirs exist in adequate number, but many are badly planned so that different species of animals are slaughtered side by side, and many lack adequate drainage, so that much river pollution occurs. Few abattoirs possess rendering plants for condemned material. Bacteriological meat inspection is not compulsory and is rarely employed even in large abattoirs.

There is no inspection of swine for trichinosis, although trichinosis in man in France is known to the medical authorities.

Foodstuffs other than meat are inspected in theory, but very superficially in practice.

The disposal of carcasses of animals which have died of disease is done either by the owner (burial, burning) or by privately owned knackeries possessing heat treatment plants. Most are antiquated.

Veterinarians are not employed officially in animal breeding.

France has a government veterinary service to co-ordinate work in the departments, which have each an official veterinary officer. Some local authorities also appoint veterinary officers.

Veterinary instruction is given at three colleges, Alfort, Lyon, and Toulouse by a four years' study course. The obtaining of a doctor's degree after passing the last examination has been compulsory since 1938 for all wishing to obtain any kind of official post in civilian or army life. Notes are given about the Alfort College.

The preparation of veterinary biological products is carried out at the *Laboratoire National des Services Vétérinaires* and at the *Institute Pasteur* and its branches.—J. E.

DANIELS. (1941). Das zivile Veterinärwesen in Norwegen. **[Civil Veterinary Affairs in Norway]**.—*Tierärztl. Rdsch.* **47.** 172–175 and 184–186.

The veterinary service of Norway operated under the Ministry of Agriculture [in 1941 it was transferred to the Ministry of the Interior] and was based on the appointment of district veterinarians in charge of local areas. The veterinary college at Oslo and the veterinary institute at Oslo are also part of the general veterinary department.

The number of veterinarians in 1939 was 378, of whom 161 were district officers, and 194 were in other State or private occupations. The veterinary college was opened in 1935; it trains only enough students to keep up the necessary veterinary strength in the country, as there is no scope for increase in private practice.

Livestock disease control is based on a law of 1894 and on two classes of notifiable diseases, of which the first class includes anthrax and similar septicaemias, glanders, rinderpest, equine infectious anaemia, swine fever, rabies, foot and mouth disease, bovine contagious pleuro-pneumonia, sheep pox, and sheep scab. The second class includes 17 diseases. Notes are given on the control measures, which on the whole are energetic. According to meat-inspection records [which are not comprehensive for the whole country] bovine TB. is rare. Bovine brucellosis has been largely eradicated.

Meat inspection is based on a law of 1892, by which it was made compulsory for the 41 towns with a population over 4,000. In addition communities of over 2,000 persons can apply voluntarily for meat inspection. As there are only a few abattoirs most meat inspection is done at special inspection stations, to which the carcasses are taken. Trichina inspection was enforced everywhere late in 1940, after many cases of human trichinosis had been observed. Meat-inspection work had got out of the hands of veterinarians to some extent in the last few years, but under German control the work is being done by veterinarians. Carcass disposal methods are crude.

The position of horse breeding is described, and the following livestock census is given for 1939 :– 204,000 horses, 1,455,000 cattle, 1,734,000 sheep, 248,000 goats, and 361,000 pigs.—J. E.

SKIDMORE, D. I. (1941). **Wherein is the Virus-Serum-Toxin Law Inadequate for the Proper Control of Veterinary Biologics?**—*Proc. 44th ann. Meet. U.S. Live Stk sanit. Ass., 1940.* pp. 212–219.

Under the terms of the Virus-Serum-Toxin

Law of 1913 no person may send from one state to another any worthless, contaminated, dangerous, or harmful virus, serum, toxin or analogous product intended for use on domestic animals, and no person may prepare such a product except under regulations prescribed by the Secretary of Agriculture. It is thought, however, that the Secretary has no authority to prohibit the inter-state movement of such products. An acute problem is said to have arisen in many states particularly in respect of *Brucella abortus* products. A committee of the American Veterinary Medical Association has reported that strain 19 of *Br. abortus* is known to be capable of producing blood reactions in cattle, and unless steps are taken to prevent its use by laymen and to permit the use of vaccine only under official auspices with requirements for tagging and reporting vaccinated animals, it will be used indiscriminately in mature cattle and used fraudulently to create reactors eligible for indemnity. S., however, believes that, in view of the exposure to natural virulent infection of susceptible animals in community yards and by shipment all over the country, the dangers derived from distribution of live cultures of low virulence in bottles where the vaccine can be effectively controlled should not be stressed too strongly.

The A.V.M.A. in 1936 agreed that the inter-state traffic in biological products was in violation of the respective state laws and had become a menace to the health of livestock; it therefore called upon the government to co-operate fully with the respective states in order that the practice of permitting the inter-state traffic in biological products containing pathogenic organisms, including those in the experimental stage, be prohibited unless in accordance with the laws and regulations of the state of destination.

S. considers that certain biological products, including *Br. abortus* vaccine, infectious laryngotracheitis vaccine, hog-cholera virus, and other viruses, are harmful to the American livestock industry, as commonly applied to domestic animals, and that they should be declared harmful under the Virus-Serum-Toxin Law and not be permitted free production and distribution. Until some such action is taken, the police powers of any state may be exercised with a view to controlling local conditions.

—H. V. Hughes.

OFFICIAL AND OTHER REPORTS

Canada, Alberta. (1939). **Annual Report of the Department of Agriculture of the Province of Alberta for the Year 1938.** pp. 160. Edmonton: A. Shnitka. [8vo].

Report of the Provincial Veterinarian [Talbot, P. R.]—Diseases of horses mentioned include Equine Infectious Anaemia, and Forage Poisoning. Investigations on the relationship of parasitic infestations to diseases of horses were continued. A serious outbreak of Equine Encephalomyelitis occurred during the summer. 17,931 doses of chick vaccine for this disease were produced at the University laboratory, and 23,240 doses were received from New York. There were 198,825 horses in the infected areas and 21,394 were infected (10·76%). Mortality was 1·83% of the total number in the areas affected but amounted to 17·00% of those actually infected. Only 6·6% of the animals in the infected areas had received encephalomyelitis vaccine.

Haemorrhagic Septicaemia caused losses in cattle in many areas, and mortality is said to be reduced by the use of bacterins. Plant Poisoning still caused losses in many areas. Water hemlock is said to be a serious factor in the mortality which occurs.

An investigation by a committee of the causes of losses among swine indicated that faults in feeding and general management, as well as Parasitic Infestations were the important factors.

Diseases of fur-bearing animals (mainly foxes and mink) were mostly due to Malnutrition as a result of faulty feeding. Parasitic Infestation, Distemper, and Encephalitis were the most important causes of loss. The importance of sanitation in the control of these diseases is emphasized.

Report of the Poultry Commissioner [Travers, C. W.]—As a measure of control all flocks showing over 8% reactors to the test for Pullorum Disease must be retested before eggs are sold to a hatchery. Turkeys are also subject to test for hatchery approval.—J. A. G.

Canada, British Columbia. (1939). **Thirty-Third Annual Report of the Department of Agriculture for the Year 1938.** pp.

L114. 10 appendixes. Victoria, B.C.: Charles F. Banfield. [8vo].

REPORT OF THE CHIEF VETERINARY INSPECTOR [KNIGHT, A.]—Tuberculin tests were made of 10,681 cattle in 1,025 herds; 104 animals reacted, nearly all of these being in four herds. Details of the work are given in tabular appendixes. A few cattle died of BLACKLEG. Blackleg aggressin proved a successful prophylactic. Infected carcasses are cremated. In one outbreak of HAEMORRHAGIC SEPTICAEMIA on Vancouver Island, five of seven cattle died, while in Voght valley 31 deaths were reported. Thirty of 112 sheep carcasses sent to Vancouver for shipping were infected with CASEOUS LYMPHADENITIS. One outbreak of COCCIDIOSIS was reported near Falkland. Nineteen of 27 cases suspected of EQUINE ENCEPHALOMYELITIS were confirmed and six of these died; it is stated that it is doubtful whether any animal once affected by the disease ever really recovers. POISONING by larkspur caused some losses among cattle throughout the province; water hemlock which is quite common in British Columbia caused a few deaths among cattle.

REPORT OF THE POULTRY BRANCH [TERRY, J. R.]—The diseases and number of cases investigated in fowls were :– TUBERCULOSIS 20, BACILLARY WHITE DIARRHOEA 6, DIPHTHERITIC ROUP 18, INFECTIOUS BRONCHITIS 2, COCCIDIOSIS 38, FOWL PARALYSIS 63, and PREMATURE MOULTING 20. Six cases of BLACKHEAD were investigated in turkeys.

REPORT OF DISTRICT AGRICULTURALISTS.—WARBLE-FLY control was carried on in many areas by means of two applications of "deraten" made at intervals of about three weeks. When treatment is thoroughly carried out, a great reduction of the number of warbles takes place.

REPORT OF THE LIVE STOCK BRANCH [GUNN, W. R.]—The effect of MALNUTRITION on animal health is emphasized. The number of "KNOCK-HEEL" cases due to eating milk-vetch, *Astragulus campestris*, has been greatly reduced. Comments are made on "PINK EYE" (KERATITIS), which made its appearance on the range. Tests on the use of a standardized derris powder, to control *Dermacentor albipictus* (the winter tick) and *D. andersonii* (the wood tick), gave good results when the powder was brushed into the coat of horses, cattle, and sheep; sheep are best treated after shearing.

—J. A. GRIFFITHS.

CANADA, BRITISH COLUMBIA. (1940). **Thirty-Fourth Annual Report of the Department of Agriculture for the Year 1939.** pp. B146. 9 appendixes. Victoria, B.C.: Charles F. Banfield. [8vo].

REPORT OF THE CHIEF VETERINARY INSPECTOR [KNIGHT, A.]—There was no increase in the numbers of animals infected with INFECTIOUS ABORTION. In an outbreak of PULMONARY OEDEMA among 100 cattle the mortality was 1%. All sheep in flocks which had contained animals infected with FOOT ROT in previous years (25,000) were found free when going out to, and when returning from, the ranges. COCCIDIOSIS occurred among young cattle near Vavenby, but there was no mortality. Only eight cases of EQUINE ENCEPHALOMYELITIS were reported; four animals recovered, three died of the disease, and one died presumably from other causes. About 18,000 horses were vaccinated. ARSENICAL POISONING occurred accidentally as the result of animals licking in places contaminated by arsenical dip fluid.

REPORT OF THE POULTRY BRANCH [TERRY, J. R.]—The principal disease of fowls and the number of cases investigated were :– TUBERCULOSIS 14, DIPHTHERITIC ROUP 21, COCCIDIOSIS 32, FOWL PARALYSIS 72, PREMATURE MOULTING 6, and OVARIAN DISEASE 6. Six cases of BLACKHEAD occurred in turkeys. There were 115,000 blood tests for PULLORUM DISEASE.

—J. A. GRIFFITHS.

CANADA, PROVINCE OF NEW BRUNSWICK. (1940). **Report of Provincial Veterinarian [1939–40].** [AKINS, J. T.]—*Rep. Dep. Agric. New Brunswick, 1939–1940.* pp. 46–51.

A beginning has been made in the control of BOVINE BRUCELLOSIS; initial tests were carried out on 1,143 cattle of which 4·4% reacted. An infectious DYSENTERY in cattle causes considerable trouble; it is stated that the affected animals recover quickly after the administration of haemorrhagic septicaemia serum and vaccine. BLACKLEG outbreaks in cattle occurred in two areas; contacts were treated with blackleg antiserum and blackleg aggressin. Mention is made of an infectious LARYNGITIS of cattle which occurs during the summer.

Horse diseases mentioned are TETANUS, JOINT-ILL in foals, BOTULISM, INFLUENZA, and POISONING by *Equisetum arvense*. The pig diseases mentioned do not include contagious diseases, which come under Federal supervision.

PULLORUM DISEASE control measures included blood testing of 47,606 birds among

which there were 0·13% reactors; 90% of the flocks tested were free from reactors. Other diseases mentioned are COCCIDIOSIS and LEUCOSIS of fowls. Coccidiosis of foxes and DISTEMPER in mink are also mentioned.—J. A. G.

CANADA. (1941). **[Report on] Bacteriology and Pathology [Ontario Research Foundation 1940].** [HADWEN].—*Rep. Ont. Res. Fdn, 1940.* pp. 10–12.

HADWEN visited reindeer herds in the far north and also the bison and other wild animals in Wainwright Park. He recommended the destruction of the bison in Wainwright Park owing to the incidence of TUBERCULOSIS and the over-grazed condition of the pastures. This has been done. Research on MASTITIS in cows has been continued [see also HADWEN & GWATKIN—*V. B.* **11**, 715]. During the autumn the staff was completely occupied in field studies and laboratory work arising from a widespread outbreak of some respiratory disease among young pigs. Autopsies showed chronic PNEUMONIA in the majority of cases and the presence of lungworms and intestinal round worms. The symptoms were coughing and a gradual loss in weight: there was a high mortality rate.—J. A. GRIFFITHS.

NEW ZEALAND. (1941). **Department of Scientific and Industrial Research (Fifteenth Annual Report of the).** pp. 92. Wellington: Govt. Printer. [fcp] [1s. 9d.].

Investigations on FACIAL ECZEMA conducted by the plant chemistry laboratory were concentrated on the "rest-nitrogen" fraction of rye-grass. [The "rest nitrogen" fraction, as defined in the previous report, is that fraction of the total soluble N in pasture plants not accounted for by the N in the amino acids, peptides, asparagine and free ammonia.] Several components exhibiting basic properties were isolated which all showed the properties of alkaloids, but none of them corresponded to any previously recorded. One of these alkaloids has been prepared in a pure state and its chemical properties have been closely studied; it has been found only in perennial rye-grass or hybrids of this and in very small quantities in Timothy grass. Five other alkaloids have been isolated and work on these is continuing.

Work has been continued on the determination of the cobalt content of samples from pasture and soil surveys of the northern half of the South Island. Further analyses have been made for the Co content of South Island limestones. Sheep-drenching experiments conducted at Glenhope have given further evidence of the efficiency of Co in rapidly increasing the body weight of "BUSH-SICK" wether hoggets. Experiments conducted at Sherry River to examine the effect of a high Co limestone as a topdressing in the prevention of "BUSH-SICKNESS" indicated that some benefit was obtained from the Co in the limestone but that the effect is of short duration.

The influence of the sex glands in growth and development of pigs was investigated. Significant effects upon the form, anatomical composition, histological structure, and the efficiency of feed utilization of the bacon pig have been demonstrated. Many of these have practical implications. The results of inbreeding studies in pigs indicated that the practice is not necessarily characterized by the dangers commonly attributed to it by farmers. Factors influencing the occurrence of still births were studied and the limited amount of data collected tends to support American work in indicating that posterior presentation in conjunction with prolonged duration of parturition increases the incidence of still-born pigs. Arrangements have been completed to study the effect of pituitrin injections in shortening the duration of parturition as a means of reducing normal losses.

In sheep nutrition experiments conducted at Massey College, the effect was studied of certain manurial treatments on the feeding value of certified perennial rye-grass and certified white clover as judged by the thrift of ewes and lambs. The mortality rate among lambs was heavy and P.M. examination showed that in most cases the thyroid gland was enlarged and hyperplastic. Blood samples from sheep affected with a form of "grass staggers" had normal Mg and Ca contents; the cause of the condition is still unknown.

Investigations have been continued on ram sterility and the results of artificial insemination with semen samples were compared with laboratory findings on the same samples.

—M. B. BUDDLE.

*NEW ZEALAND. (1940). **Annual Report of the Live-stock Division.**—[BARRY, W. C.]—*Rep. Dep. Agric. N.Z. 1939–40.* pp. 5–15.

ANIMAL DISEASES

Horses.—No serious disease of an epidemic nature was recorded during the year. There were a number of cases of STRANGLES, and JOINT-ILL in foals, as well as several cases of so-called "AUSTRALIAN STRINGHALT". Forty-two draught stallions were examined for soundness under the Stallions Act and of these 37 were approved. Under the Remounts Encouragement Act of 1914, 39 stallions were subsidized and 1,339 mares were approved for service.

Cattle.—Condemnations for TUBERCULOSIS under the Stock Act were 6,589. The tuberculin test was applied to 17,877 cattle, of which 950, or 5·3% reacted. Cattle examined at abattoirs totalled 518,201, 7·68% of which were affected with TB. to some degree. Owing to inconsistent results from the use of johnin as a diagnostic agent for JOHNE'S DISEASE, the systematic testing of affected herds has been to some extent discontinued, and replaced by clinical examination. Forty animals were condemned in the Taranaki district on clinical grounds. In the Auckland district 42 were condemned. The death of one cow from ANTHRAX was confirmed. This occurred on a North Auckland farm where anthrax occurred about six years earlier. Vaccinations against BLACKLEG totalled 32,636. Control by vaccination continues to give good results. Condemnations for MALIGNANT GROWTHS were 346.

Among non-scheduled diseases the usual incidence of MASTITIS, CONTAGIOUS ABORTION, and TEMPORARY STERILITY is recorded. "GRASS STAGGERS" and "MILK FEVER" were less common than usual and it is suggested that this may be associated with a late spring and shortage of feed.

Sheep.—A serious outbreak of BLACKLEG was experienced. [*Clostridium chauvoei* infection in sheep has been considered to be very unusual in New Zealand.] A vaccine was prepared at Wallaceville which appeared to give satisfactory results. Complaints have been received about the development of abscesses following the use of alum-precipitated toxoid for vaccination against INFECTIOUS ENTERO-TOXAEMIA. These abscesses may persist for several months after vaccination and, although not usually resulting in rejection for export at the works, may adversely affect the grading of affected carcasses. The vaccine prepared at the Animal Research Station, Wallaceville, against CONTAGIOUS ECTHYMA confers strong immunity. An examination of viscera of stock killed at abattoirs was being conducted to determine the percentage of organs affected in HYDATID DISEASE. Hogget losses from PARASITIC GASTRO-ENTERITIS were less severe than in previous seasons, probably due to drier pasture conditions and more systematic drenching. The incidence of PREGNANCY TOXAEMIA was lighter than usual and this is related to the feed conditions which resulted in the ewes being in excellent health at lambing time. No serious outbreaks of PHOTOSENSITIZATION were recorded.

Pigs.—The number slaughtered at registered premises was 799,759, and of these 17·49% were tuberculous to some degree. *Salmonella suipestifer* infection continued to be the most important infectious disease of pigs. No cases of SWINE ERYSIPELAS were reported. A few pigs at one killing plant were infected with *Stephanurus dentatus*. As this condition is prevalent in some Australian states it may be necessary to control the importation of pigs from Australia.

MEAT INSPECTION AND SLAUGHTER OF STOCK

During the year the Meat Bill was passed by Parliament and the Meat Act became law on 1st April, 1940. This Act consolidated and amended the then existing legislation and introduced a more complete inspection of meat for local consumption.

Figures for stock slaughtered, exports and imports, and present populations are presented.

—LEWIS FITCH.

*NEW ZEALAND. (1941). **Annual Report of the Live-stock Division.**—[BARRY, W. C.]—*Rep. Dep. Agric. N.Z. 1940–41.* pp. 5–17.

ANIMAL DISEASES

Horses.—No serious epidemic of horses occurred during the year but STRANGLES became prevalent where horses were concentrated at centres such as mounted camps.

The Stallion Act applies only to the compulsory examination of the younger stallions, but should assist in the eventual elimination of the unsound stallion.

In regard to the breeding of light horses, subsidies were again provided under the Remounts Encouragement Act, enabling owners of approved mares to obtain the services of

selected and approved stallions at reduced prices.

Cattle.—Condemnations under the Stock Act for TUBERCULOSIS were 5,211. The tuberculin test was applied to 9,703 cattle, of which 4·8% reacted. Cattle examined at abattoirs totalled 650,030, of which 6·35% were affected in a varying degree. Twenty-nine animals in the Taranaki district and 12 in the Auckland district were condemned on clinical examination for JOHNE'S DISEASE. The disease has appeared on some new farms in both districts. An outbreak of ANTHRAX occurred on two dairy farms in the Bombay district. On one of these the disease had appeared thirty years earlier. Vaccination is effective in the control of BLACKLEG and 37,733 calves were so protected. Condemnations for ACTINOMYCOSIS and ACTINOBACILLOSIS were 589. Condemnations on account of MALIGNANT GROWTHS were 282.

The incidence of MASTITIS, CONTAGIOUS ABORTION, TEMPORARY STERILITY, "GRASS STAGGERS" and "MILK FEVER" is discussed.

Sheep.—The climatic and feed conditions experienced favoured the maintenance of very satisfactory animal health and productivity. There was no serious sheep mortality and one of the best lambing seasons on record was experienced. The incidence of HYDATID DISEASE in stock sent forward for slaughter had not materially improved. It is contended that this is due to the carelessness of owners and shepherds in not dosing their dogs with the recognized taeniacide in spite of much publicity.

Pigs.—16·7% of pigs inspected at slaughter were affected with TUBERCULOSIS. The prevalence of the main diseases of swine is discussed.—M. B. BUDDLE.

*NEW ZEALAND. (1940). **Annual Report of the Animal Research Division.**—[FILMER, J. F.]—*Rep. Dep. Agric. N.Z. 1939–40.* pp. 16–19.

This report covers the first year of existence of the Animal Research Division. An effort has been made to co-ordinate all research activities of the Department of Agriculture and secure active collaboration with other institutions engaged in animal research work.

Diagnostic work at Wallaceville is described and the usual analysis of specimens examined is given, as well as a list of biological products issued.

Investigations on FACIAL ECZEMA continue to be directed by the Facial Eczema Management Committee [see *V. B.* **9.** 488]. Work on this condition was somewhat hampered by the fact that climatic conditions did not greatly favour its development. Efforts were made to provide chemists with definitely toxic pasture, and comprehensive chemical surveys of pastures and soils have been carried out. Lambs' livers have been sampled weekly at seven North Island meat works and in all 2,588 specimens have been examined histologically. Biochemical technique has been improved, particularly with regard to the detection of photosensitizing agents. PHOTOSENSITIZATION in experimental animals has been studied, known photosensitizing agents and standard sources of light being employed, and attention has been given to the experimental production of liver damage similar to that seen in facial eczema. COPROPORPHYRINAEMIA, a symptom of facial eczema, has also been the subject of special study.

PHOTOSENSITIZATION, which externally resembles facial eczema but is distinguished from it by the absence of liver lesions, has been known in some strains of Southdowns for many years. It is considered probable that a predisposition to the disease is inherited. During the year biochemical studies have been made and a breeding experiment has been initiated to study the genetic aspect of the disease.

A farm has been leased in the Kirwee district, Canterbury, where all aspects of the problem of sheep mortality are to be studied.

Experimental work on MASTITIS bears mainly on the relationship between milking machines and mastitis and the possible role of the former in the production of the condition. Consideration is being given to the development of a standard milking machine, with particular attention to mechanical simplicity and durability, milk hygiene, and the effect produced on the udder.

"BUSH SICKNESS" can be controlled by annual topdressing with small amounts of cobalt. The fundamental aspect of the action of cobalt is being studied. Chemical work has indicated the value of the cobalt status of the liver for the diagnosis of "bush sickness".

Work is continuing on CONTAGIOUS ABORTION, PULPY KIDNEY DISEASE, "GRASS STAGGERS" in dairy cows, "RYE-GRASS STAGGERS" in sheep and cattle, bull sterility, artificial

insemination, pig nutrition, dairy cow nutrition, chilled-beef production, curd feeding of poultry, feed flavour, rate of growth of pasture, ragwort eradication, bone pathology, poisonous plants, and chemistry of fats.—LEWIS FITCH.

*NEW ZEALAND. (1941). **Annual Report of the Animal Research Division.** [FILMER, J. F.]—*Rep. Dep. Agric. N.Z. 1940–41.* pp. 18–22.

During the year greatly improved facilities for research were provided at Wallaceville by the opening of the new laboratory. A list is given of the specimens examined in the diagnostic work of this department.

Experimental work on FACIAL ECZEMA and PHOTOSENSITIZATION has continued during the year under the general direction of the Facial Eczema Management Committee. The disease occurred over a fairly widespread area in the Wairoa district and small isolated outbreaks occurred in other districts. At Wairoa pasture samples which were definitely incriminated as being responsible for the disease in grazing animals were collected and fractions will be biologically tested in an endeavour to isolate the toxic principle responsible for producing the liver derangement.

A group of substances having the properties of alkaloids have been isolated from perennial ryegrass and other pasture species. Four of these substances have been crystallized and animal experiments have shown one of them to be a photosensitizing substance which is probably responsible for a form of sporadic mild photosensitization occurring in sheep in New Zealand. There is no evidence as yet incriminating these substances as the cause of facial eczema or any other important disease of livestock in New Zealand.

Two forms of photosensitization differing from facial eczema have been recognized in the South Island, and are under investigation.

Work has been continued in Canterbury on the influence of various feeding programmes on sheep mortality, but favourable seasonal conditions mitigated against a serious mortality.

The work on the influence of milking machines on MASTITIS production was continued. An experiment has been designed to determine the true value of the segregation method of controlling mastitis by the removal from an experimental herd of all cows carrying the causal organisms.

Comparison of the results of microscopic examination of bulls' semen with breeding data indicated that the method is of practical value. A semen-testing service was made available to dairy farmers and 12 bulls were found to be completely or nearly sterile.

Experimental work is being continued on the control of BOVINE BRUCELLOSIS by calfhood vaccination with attenuated cultures.

Work on other subjects embraced PULPY KIDNEY DISEASE, ARTHRITIS in pigs, OSTEOPETROSIS in fowls, " GRASS STAGGERS " in dairy cows, bull sterility, artificial insemination, pig and dairy cow nutrition, pasture and soil chemistry, cobalt deficiency, bone diseases, zinc poisoning in pigs, the toxicity of ergot for sheep, and the chemical control of ragwort.

—M. B. BUDDLE.

—. (1941). Uebersicht über den Stand der ansteckenden Krankheiten der Haustiere in der Schweiz im Jahre 1940. **[Tabular Summary of Infectious Diseases of Domestic Animals in Switzerland in 1940].**—*Schweiz. Arch. Tierheilk.* **83.** 38–39.

This table shows the incidence, according to canton and to month, as well as the year's total compared with 1939, of anthrax, blackleg, swine erysipelas, foot and mouth disease, swine fever and swine plague, contagious agalactia in sheep and goats, fowl cholera and fowl plague, mange in horses, sheep and goats, and three diseases of bees.

Glanders was not observed at all. Foot and mouth disease was not present to a serious extent, whilst the pig diseases mentioned were very prevalent.—J. E.

BOOK REVIEWS

WHITLOCK, J. H. [Assistant Professor of Veterinary Pathology, Kansas State College of Agriculture and Applied Science, Manhattan, Kansas]. (1938). **Practical Identification of Endoparasites for Veterinarians.** pp. 37. 25 figs. Minneapolis: Burgess Publishing Company. [4to] [Mimeoprinted] [$1·25].

This publication is designed primarily for the use of veterinary practitioners, students, and others desirous of identifying the internal parasites of domesticated animals without

having recourse to taxonomic literature couched in technical language. Identification is by means of keys, based primarily upon the host, organ, and lesion specificity shown by most of the common helminth and arthropod parasites, and secondarily upon the morphology of the parasite; amongst the Protozoa only the sarcosporidia appear to be mentioned. Aberrant forms have been included in the keys except where their inclusion would result in confusion with the more common forms. Names and facts generally accepted or appearing in publications from the Zoology Department of the U.S. Bureau of Animal Industry are used, with a few exceptions, while only those synonyms and common names are given which are familiar to the veterinarian. All the illustrations are simple line drawings and magnifications are shown. There is some discussion on the nomenclature of parasites and a short glossary of morphological terms used in the keys. Fourteen references are given to monographs on parasites or their taxonomy.

The publication is mimeoprinted, adequately bound, and will be of considerable assistance to those lacking the advanced technical knowledge of the laboratory worker.—J. N. OLDHAM.

REBRASSIER, R. E. [Dr., Department of Veterinary Parasitology, College of Veterinary Medicine, Ohio State University]. (1940). **Identification and Life Cycles of Parasites Affecting Domestic Animals.** pp. 89. Numerous figs. Columbus: Ohio State University Press. [8vo]

This treatise is an enlarged edition of, and replaces, a similar publication entitled "Diagnosis of Parasites in Animals" issued in 1938. The first eight pages are devoted to concise descriptions and discussions of various techniques such as faecal examinations and factors which interfere with such examinations, the examination of skin scrapings, and to brief morphological descriptions of the various groups of mites likely to be encountered by veterinarians, the examination of blood for microfilariae, and the preparation for identification of ticks, lice, and fleas. There follows a series of photographs of the commoner helminths, insects, mites, and ticks which may parasitize the various domestic animals and poultry. In addition, there are 27 diagrammatic drawings illustrating the life-cycle of most of the helminths and 129 photographs of microscope preparations of various worm eggs and species of coccidia showing their appearance at magnifications of $\times 100$ and $\times 400$. Following these is a brief list of references and text-books, and a two-page index.—J. N. OLDHAM.

MOSELEY, E. L. [Professor Emeritus of Biology, State University, Bowling Green, Ohio]. (1941). **Milk Sickness Caused by White Snakeroot.** pp. iv + 171. 2 figs., 1 map. Bowling Green, Ohio: Ohio Academy of Science & The Author. [8vo] [$1.00].

This monograph is largely a compilation of traditional records and scientific data on "milk sickness" in the human subject and on the toxicity of white snakeroot (*Eupatorium urticaefolium*) for man and animals. Quotations from the extensive literature on this subject, which the author has searched and recorded with great diligence, comprise the greater part of the monograph.

White snakeroot is found throughout the greater part of the eastern half of the U.S.A. and south-eastern Canada. Poisoning in man usually arises following the consumption of milk or milk products from cows which have eaten the plant. White snakeroot is also directly toxic for most species of animals, where poisoning is characterized by muscular weakness and trembling. In lactating cows, however, the toxic principle appears to be eliminated in the milk and such animals seldom show symptoms of poisoning. The author devotes a chapter to the toxic manifestations in domestic animals and indicates treatment which may be applied. The concluding chapters deal with the plant and its habitat, methods of eradication, and a review of work on the poisonous constituents of white snakeroot.

The monograph contains an extensive bibliography. The author has omitted descriptive captions from the map and plant photographs.—N. J. SCORGIE.

BERGMAN, H. D. [D.V.M.], & HEWITT, E. A. [D.V.M., Ph.D.] [Department of Veterinary Physiology and Pharmacology, Iowa State College, Ames, Iowa]. (1941). **Laboratory Manual for Experimental Physiology.** pp. iii + 113. Minneapolis, Minn.: Burgess Publishing Company. [4to] [$1.75].

This manual is intended to serve as a laboratory guide and notebook for veterinary and biological students undertaking a course in experimental physiology. A description of the

method of procedure is given for 217 separate experiments, and the authors state that " there is no single experiment outlined that cannot be properly carried out within a three hour laboratory period, and ordinarily several experiments may be performed in that time ". The manual is provided with blank pages on which the experiments may be recorded as performed together with observations and conclusions made by the student. Following many of the experiments specific questions are asked which the student is required to answer.

The experiments cover most of the usual subject matter dealt with in elementary physiology text-books. The scope of the manual is summarized in the following quotation from the authors' preface :

" In compiling this manual an attempt has been made to outline the experiments as briefly and concisely as possible, and yet to make them sufficiently comprehensive to give the student a proper understanding of the subject under consideration. In addition, a considerable amount of supplementary informative material of textbook nature has been included. . . . Descriptions and illustrations of experimental apparatus have been omitted as discussion of these is properly the function of the laboratory instructor. Likewise, results and conclusions drawn from experiments have been largely left to the student to solve for himself ".

It can be said that the student will have little difficulty in following the descriptions of experiments given in the manual. One criticism is that no reference is made to the physiology of rumination, and one might suggest that experiments dealing with this subject, of prime importance to the veterinary student, should be included in a future edition of the manual. The authors are to be commended for the excellence and high standard of the experiments chosen, and it is to be confidently expected that students and teachers of physiology in the veterinary schools will find this manual a valuable aid to the teaching and study of practical and experimental physiology.

—N. J. SCORGIE.

—. (1939). **The Vitamins. A Symposium Arranged under the Auspices of the Council on Pharmacy and Chemistry and the Council on Foods of the American Medical Association.** pp. 637. Numerous figs. Chicago : American Medical Association. [8vo] [$1.50].

The 31 chapters of this book, written by 30 different authors presenting different aspects of the subject from different points of view, provide a comprehensive digest of current knowledge on the vitamins. The names of the various contributors to the symposium are sufficient guarantee of the quality of the essays and it only remains to indicate the titles. These are :- I—The Chemistry of Vitamin A and Substances Having a Vitamin A Effect ; II—Vitamin A—Physiology and Pathology ; III—The Pharmacology and Therapeutics of Vitamin A ; IV—Vitamin A—Methods of Assay and Sources in Food ; V—Vitamin A Requirements and Practical Recommendations for Vitamin A Intake ; VI—The Components of the Vitamin B Complex ; VII—The Chemistry of Thiamin (Vitamin B_1) ; VIII—The Physiology of Vitamin B_1 ; IX—The Pathology of Beriberi ; X—The Therapeutic Use of Vitamin B_1 in Polyneuritis and Cardiovascular Conditions ; XI—Vitamin B_1—Methods of Assay and Food Sources ; XII—Human Requirements for Vitamin B_1 ; XIII—Chemical Aspects of Riboflavin ; XIV—Riboflavin—Physiology and Pathology ; XV—Riboflavin—Dietary Sources and Requirements ; XVI—Vitamins in Relation to the Prevention and Treatment of Pellagra ; XVII—The Chemistry of Vitamin C ; XVIII—The Physiology of Vitamin C ; XIX—The Pathology of Vitamin C Deficiency ; XX—Vitamin C—Methods of Assay and Dietary Sources ; XXI—Human Requirements of Vitamin C ; XXII—Vitamin C—Pharmacology and Therapeutics ; XXIII—The Chemistry of Vitamin D ; XXIV—Physiology and Pathology of Vitamin D ; XXV—The Determination and Sources of Vitamin D ; XXVI—The Human Requirement of Vitamin D ; XXVII—The Use of Vitamin D Preparations in the Prevention and Treatment of Disease ; XXVIII—Physical Aspects of Ultraviolet Radiation in Vitamin D Therapy ; XXIX—Clinical Aspects of Ultraviolet Therapy ; XXX—Vitamin E ; XXXI—Other Factors—Less Well Known Vitamins.

It will be noted that the appeal of these titles is a very wide one and that those interested in the general health aspects are catered for as well as those interested in the biochemical aspects. A good index enables particular points to be looked up quickly in the various essays, so turning the book into a convenient reference work on most essential points. Each individual essay has its own bibliography for those who wish to follow up original literature.

—H. H. GREEN.

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